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ORIGINAL RESEARCH

ESG performance, tone of earnings calls, and market reaction during an economic crisis

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Abstract
This study explores the relationship between firms' environmental, social, and governance (ESG) performance, the tone of earnings calls, and market reaction during the COVID-19 outbreak. Using a comprehensive sample of European listed firms and a robust methodology, our findings show a less optimistic tone of the earnings calls during COVID-19 and a negative relationship between ESG and tone, wherein firms with lower ESG project a more positive outlook in their earnings calls to reassure stakeholders. We find a positive market reaction to the tone of earnings calls, which is more pronounced for firms that seek to reassure with an inflated tone, even in presence of lower ESG. This study offers new evidence on the value relevance of non-financial information as a driver of managerial tone and the effectiveness of companies' communication strategies in reassuring stakeholders and market participants during an economic crisis; it provides insights into how companies could respond to manage stakeholders' expectations when dealing with significant large-scale disruptions.

Keywords earnings call · tone · ESG performance · impression management · event study · COVID-19

JEL codes M14 · M49 · G14

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1 Introduction

On 11th March 2020, after the first outbreak in China and northern Italy, COVID-19 reached more than 118,000 cases across 114 countries, and 4,291 people lost their lives. At that point, the World Health Organization (WHO) recorded a 13-fold increase in the number of cases in two weeks, a three-fold increase in the number of affected countries and declared the outbreak of COVID-19 a pandemic[1]. In addition to its serious consequences on people's health, COVID-19 resulted into the recession of world economies and varying levels of stock market volatility around the globe, with the Dow Jones Industrial Average and FTSE 100 plunging by 23% and 25%, respectively, in March 2020 (Uddin et al. 2021). The pandemic has also attracted increasing attention from the academic community, highlighting the need for a collective reflection on the impacts of the pandemic, how organisations have responded to the crisis and what can be learned for the future (i.e., Bapuji et al. 2020; Zattoni and Pugliese 2022). Within this debate, we explore the tone of earnings calls for European firms during the first wave of the COVID-19 pandemic and its relationship with firms' environmental, social, and governance (ESG) performance. Further, we implement event study methodology to estimate stock market reaction to the release of earnings calls and investigate how tone drives the market reaction during crisis.

Indeed, during the first wave of the COVID-19 outbreak, companies announced their financial results for the first half of 2020 and scheduled conference calls to present and discuss these with investors. Earnings conference calls represent a recurring voluntary corporate communication and an opportunity for market participants to listen to a presentation of a company's financial position by senior management and ask questions about past performance and future developments (Blau et al. 2015; Hassan et al. 2023). Earnings conference calls are found to have a significant impact on firms' stock returns (i.e., Bochkay et al. 2020; Larcker and Zakolyukina 2012; Price et al. 2012) and firm value (Voleti et al. 2025), and their tone is significantly influenced by manager-specific tendencies to be optimistic or pessimistic (Davis et al. 2015; Ning et al. 2025). Moreover, Hao et al. (2025) show that the communicative value of earnings call transcripts enhances bankruptcy prediction accuracy, highlighting their informational content. In the presence of extreme language used in earnings calls, trading volume increases, stock prices react more strongly, and linguistic extremity affects analyst opinions (Bochkay et al. 2020). For the calls held in the first half of 2020, companies had to account for their performance and prospects in the face of the COVID-19 outbreak, legitimise their position, and reassure their stakeholders in a very uncertain business environment; this provides an interesting backdrop to explore corporate communication during an economic crisis. Moreover, non-financial performance (ESG) has become indispensable for understanding investors' reactions in the new era of COVID-19, which has pushed ESG strategies into the spotlight (Diaz et al. 2021; Li et al. 2025). ESG performance has been considered as a resilience factor, an 'equity vaccine' against declining share prices (Willis 2020), a form of firm reputation with the potential of serving as a shield in sparing value destruction for high ESG performance (Demers et al. 2021). Hence, it is interesting to study how firms communicate in their earnings calls, how this relates to their past ESG performance, and if this indeed helps achieving the intended objective of reassuring stakeholders. While previous literature has documented the nature and the benefits of

[1] The World Health Organization announcement can be found at https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-COVID-19---11-march-2020.

companies' reporting in normal times, the tone of earnings calls and the subsequent market reaction (among others, Bochkay et al. 2020; Blau et al. 2015; Davis et al. 2015; Fu et al. 2021; Price et al. 2012), to the best of our knowledge no other study provides a comprehensive analysis in times of crisis.

Using a sample of firms listed in STOXX Europe 600, we analyse the relationship between ESG performance and the tone of earnings calls to address the question: *What is the relationship between ESG performance and the tone of earnings calls during an economic crisis?* Our findings show that the tone of the earnings calls held during the COVID-19 outbreak is significantly less positive and less optimistic compared to the calls of the same firms in the previous year, highlighting the uncertainty following the pandemic. The overall level of ESG performance has a negative and significant effect on tone, implying that firms with lower ESG performance project a more positive outlook on their earnings calls to reassure their stakeholders during an economic crisis like the COVID-19 pandemic. Additionally, we implement event study methodology to investigate stock markets' reaction to the release of earnings conference calls to address the question: *How do stock markets react to earnings conference calls during an economic crisis?* The findings indicate a significantly positive market reaction to earnings calls during COVID-19, which is even more pronounced for firms that seek to provide a more positive tone even when they have lower past non-financial performance. Our findings are consistent across various model specifications, alternative measures of tone, and a series of robustness tests.

This study offers several contributions to research and practice. We contribute to the literature that deals with conference call disclosure tone, ESG performance and abnormal returns, specifically in the context of an economic crisis like the COVID-19 pandemic. While the tone of the communication is of increasing attention in academic literature (Blau et al. 2015; Hollander et al. 2010; Ning et al. 2025; among others), to the best of our knowledge this is the first study to investigate the relationship between past non-financial performance (ESG) and the tone of earning calls in the context of an economic crisis. Further, we contribute to the literature that deals with the drivers of conference call disclosure tone, introducing ESG performance as a new lens, and add to the literature on the value relevance of non-financial performance as a driver of managerial tone in earnings calls. From a theoretical perspective, we consider ESG performance as a form of firm reputation and contribute to the literature exploring the role of organisational reputation in serving as a buffer or liability for firms during crisis (Park and Rogan 2019; Pfarrer et al. 2010; Rhee and Haunschild 2006; Timothy Coombs and Holladay 2006). Additionally, we extend previous studies on the effect of tone on abnormal market returns (Blau et al. 2015; Huang et al. 2014; Price et al. 2012) by investigating tone in the presence of past non-financial performance (ESG). We provide the first glimpse of stock market reactions to corporate communication strategies during an economic crisis, and present insights into how companies could respond to manage stakeholders' expectations when dealing with significant large-scale disruptions.

Our research also yields significant policy implications. From a practical perspective, investigating the drivers of the tone is important as it helps in assessing the transparency of corporate communications. Given the manipulable nature of companies' communication and the external stakeholders' focus on ESG performance, managers may have an incentive to manage impressions on the basis of their ESG performance (Hamza et al. 2023; Yang et al. 2025). The analysis of the market reaction to corporate communication during crisis helps organisations to understand and anticipate the consequences of their communication.

The context of the pandemic represents an opportunity to study companies' resilience and how organisations can manage threats through anticipation, avoidance, or adjustment. The findings from this study shed light on how firms can respond and what makes them resilient in the face of a crisis. Understanding the relationship between ESG and tone, as well as how stock markets react during the pandemic, offer insights to companies when developing their own choices on ESG and tone of communication, as well as investors when assessing corporate communication, and policymakers when formulating policies and initiatives related to ESG.

The remainder of the paper is organised as follows. Section 2 reviews the existing literature. Section 3 describes the sample selection process and methodology. Section 4 discusses the empirical results. Section 5 provides robustness tests. Section 6 concludes the paper.

2 Literature review

2.1 Theoretical background

Legitimacy is vital for an organisation's survival and can act as a goodwill buffer during adverse times (Suchman 1995). As social expectations of an organisation change along with fluctuations in the environment, an organisation needs to show that what it is doing is also changing (Deegan 2014); differently, organizations with frail legitimacy are more subject to the risk of being perceived as unnecessary or irrational (Dowling and Pfeffer 1975). Organisations use social and environmental reporting as a means of restoring legitimacy (Brown and Deegan 1998; Deegan 2002; O'donovan 2002), and those facing legitimacy threats engage in specific disclosure strategies aimed at altering perceptions about their legitimacy (Beelitz and Merkl-Davies 2012; Cho and Patten 2007; Wang 2010). Similarly, organisational efforts to achieve or enhance legitimacy are consistent with attempting to protect or improve reputation and image (Deephouse and Suchman 2008). Drawing from legitimacy theory, previous studies show that companies view their reports as a public relations vehicle, designed to offer reassurance and help with a feel-good image-building exercise (Elkington and Rowlands 1999; Gray et al. 1993; Hooghiemstra 2000).

Legitimacy theory is strongly linked to impression management (Cho et al. 2015; Hooghiemstra 2000; Suchman 1995; Van der Steen and Trapp 2025), that represents a conscious and deliberate managerial disclosure strategy in which managers introduce a reporting bias by selecting a style of presentation and choice of content that are beneficial to them (Melloni et al. 2017; Merkl-Davies and Brennan 2007). In the impression management approach, managers exploit information asymmetries between them and firm outsiders, and they can bias the amount, scope, and tone of the disclosed information (Clatworthy and Jones 2001; Merkl-Davies and Brennan 2007). While legitimacy theory provides insights into the way organisations influence how society perceives them (Cho et al. 2015; Suchman 1995), impression management can be considered a strategy for managing stakeholders' perceptions and addressing legitimacy threats (Hooghiemstra 2000; Perkiss et al. 2020). It represents an opportunistic effort to manage stakeholder impressions to establish, maintain or repair corporate legitimacy by managing and manipulating disclosures about corporate

achievements and practices (Clatworthy and Jones 2001; Perkiss et al. 2020; Yuthas et al. 2002).

This is particularly relevant during economic crisis. In a highly uncertain business environment, corporate legitimacy is constantly under scrutiny, and public-wide acceptance is more difficult to obtain (Li et al. 2016). In uncertain times, when the perception of risk is high, the perception of organisational legitimacy both affects and is affected by stakeholders' perceptions and sense of expectation accomplishment. Nevertheless, crisis environments can offer an opportunity for legitimation if an organisation can fulfil stakeholders' expectations (Bajaj et al. 2023; Dardis and Haigh 2009; Giacomini et al. 2021; Linsley and Kajuter 2008).

A stream of literature explores the effects of organisational reputation on firm performance, by investigating how firm reputation can provide a buffer for firms in presence of adverse events (Park and Rogan 2019). In the context of our study, COVID-19 represents an economic crisis and ESG performance represents a proxy of firm reputation, focusing on the conceptualisation of organisational reputation as being known for something (Lange et al. 2011). Indeed, ESG performance reflects a company's environmental, social, and governance commitment, and firms that are committed to ESG benefits in terms of reputation (Maaloul et al. 2023).

Organizational reputation can serve as a buffer reducing the negative reactions of stakeholders. High reputation firms experience greater market rewards for positive surprises and smaller market penalties for negative surprises than other firms (Pfarrer et al. 2010); higher reputation firms experience less damage to their reputation after downsizing (Love and Kraatz 2009); a reputation for social responsibility has been found to protect firms from stock declines associated with crisis (Schnietz and Epstein 2005). Reputation can create a halo effect that protects an organization during a crisis; it might work as a shield that limits the potential reputational damage and might encourage stakeholders to give the organization the benefit of the doubt in the crisis (Timothy Coombs and Holladay 2006). However, firm reputation can also be a liability, in that highly reputed firms suffer more market penalties as a result of their product recalls (Rhee and Haunschild 2006). Firm reputation can be measured in different ways, and firms can have multiple reputations (Park and Rogan 2019). In the process of legitimising their position and actions, organisations can use their disclosures to window dress corporate behaviour to compensate for their lower reputation levels and construct a strong external face (e.g., Cho et al. 2015; Perkiss et al. 2020), especially during crisis. Within this stream of research, we explore the tone of earnings conference calls, how firms' ESG performance affects the tone of the communication, and how external stakeholders react to companies' communication strategies during economic crisis.

2.2 The tone of earnings conference calls

During an earnings conference call, a company's senior management presents the financial results of a reporting period to financial analysts and other market participants, who have the opportunity to ask questions and discuss current developments (Flake 2025; Hassan et al. 2023; Hollander et al. 2010). Earnings calls are structured into two sections: first, an introductory portion that is generally uninterrupted, provides managers with an opportunity to set the tone and functions as a baseline tone level of the call; this is followed by a discussion session involving interactive questions and answers which enables analysts to probe

for more nuanced information (Blau et al. 2015). Conference calls contain soft information supplementary to those published in corporate filings and press releases, are dynamic in nature, i.e., not scripted, and involve an exchange of dialogue; thus, they represent a rich information source that is extensively used to disseminate value relevant corporate information to investors. Their interactive and dynamic nature implies that earnings calls have the potential to signal additional pertinent information about the firm (Blau et al. 2015) and help mitigate potential information asymmetry between managers and investors (Price et al. 2012).

Research has explored the role of analysts and investors during earnings conference calls and how they react to the linguistic tone adopted by management. Studies investigate the ability of investors to detect managers' lack of spontaneity (Lee 2016), the tone of the manager–analyst dialogue, and its effect on intraday prices (Chen et al. 2018), and how institutional ownership impacts conference call tone (Amoozegar et al. 2020). Managers are very careful about their choice of words and may either knowingly or unknowingly use an overly positive linguistic tone that mitigates negative news or overemphasises good news. Within this stream of research, previous studies have found evidence of a positive relationship between the linguistic tone (sentiment) conveyed in conference calls and firms' stock returns (Hennig et al. 2025; Larcker and Zakolyukina 2012; Price et al. 2012; Rogers et al. 2011). Davis et al. (2015) claim that managers use language in earnings press releases to convey signals regarding future expectations and that the market, broadly defined, responds to linguistic signals. Davis and Tama-Sweet (2012) find evidence that managers tend to increase their use of optimistic language in earnings press releases when they feel it is to their advantage to establish such a tone. Price et al. (2012) indicates that broad market reactions, which is generally attributable to uninformed traders, are positively related to a conference call linguistic tone that is positive in nature. Firms whose year-end conference calls had a less optimistic tone are found to have higher stock price crash risk in the following year (Fu et al. 2021). Similarly, the tone of conference calls is significantly influenced by manager-specific tendencies to be optimistic or pessimistic, in addition to reflecting current and future performance (Davis et al. 2015). Bochkay et al. (2020) find that extreme language plays an important role in communicating reality; indeed, when managers use more extreme words in earnings calls, trading volume increases, stock prices react more strongly, and linguistic extremity also affects analyst opinions.

Previous studies investigate earnings conference calls during normal times. What happens in times of crisis such as the COVID-19 pandemic is an interesting area of investigation that we explore in this study. We examine the tone of earnings calls during the COVID-19 pandemic (*COVID*) compared to the tone of earnings calls in the same reference period of the previous year (*PRE-COVID*) and analyse the relationship between ESG performance and tone.

2.3 ESG performance and tone of earnings calls

Emerging evidence supports the view that highly sustainable firms enjoy lower downside risk and are resilient during turbulent times. Hoepner et al. (2024) find empirical evidence that firms engaging with ESG issues reduce their downside risk, whereas Ilhan et al. (2021) provide evidence that firms with poor ESG profiles endure higher tail risk. Cohen (2023) investigates the impact of ESG risks on corporate value, showing that the total ESG score

is diminishing for the S&P500 firms from 2019 to 2021 and the impact of environmental risks on the firm's valuation is not significant enough. Similarly, Monti et al. (2022) document that higher CSR scores are related to lower risk measures. The role of ESG during financial crises has been evidenced in Lins et al. (2017), who observe higher financial performance during crisis periods for firms with high ESG scores. Further, Cornett et al. (2016) show that the financial performance of US banks during the global financial crisis was positively related to their ESG score, supporting the idea of the flight to quality. Broadstock et al. (2021) find that high-ESG portfolios generally outperform low-ESG portfolios, ESG performance mitigates financial risk during the crisis, and the role of ESG performance is attenuated in normal times, confirming its incremental importance during a crisis. However, there is no empirical evidence on the relationship between ESG performance and the tone of earnings calls during an economic crisis.

Chen and Wang (2025) find that ESG rating disagreement heightens market pressure on managers, thereby motivating them to intensify tone manipulation, while the accompanying noise effect creates additional opportunities to do so. Complementing this view, Bikmetova and Pirinsky (2026) show that increased ESG rating agency coverage can improve firms' ESG performance, while Nedunuru and George (2026) demonstrate that ESG contracting reduces ESG decoupling. Melloni et al. (2017) find evidence of impression management in terms of quantity, syntactical reading ease, thematic content, and verbal tone manipulation in corporate reporting. Amir and Lev (1996) suggest that investors rely more heavily on non-financial information during periods of uncertainty. This suggests that managers may be more inclined to manage impressions, especially during times of crisis.

ESG performance reflects a company's environmental, social, and governance commitment, and as such it can be considered as a form of company's reputation, specifically representing the concept of being known for something (Lange et al. 2011). Although firm reputation is a critical factor for explaining reactions to adverse events, literature shows contradictory findings suggesting the need for further research (Park and Rogan 2019). We follow the approach that firm reputation may represent a liability for firms during crises (Rhee and Haunschild 2006). Indeed, from a company perspective, we expect a trade-off between ESG performance and the tone management decides to use in the earnings calls. In presence of low ESG performance, companies experience less reputational risk, perceive lower expectations from stakeholders, and eventually less scrutiny, and may enhance the positive tone as a way to compensate for the lower reputation and project a more positive outlook to their stakeholders. However, in presence of high ESG performance, companies are subject to higher scrutiny and expectations from stakeholders, and this becomes particularly challenging during economic crisis; managers would communicate more cautiously, using a more negative tone as a risk adverse strategy to maintain credibility.

H1. There is a negative relationship between ESG performance and the tone of earnings calls during an economic crisis.

2.4 Stock market reaction to earnings conference calls

According to the efficient market hypothesis, market participants react to newly available firm-specific information; this applies to financial information as well as to soft or qualitative information (Blau et al. 2015). Previous studies find evidence of a positive relation-

ship between linguistic tones used in conference calls and firms' stock returns (Price et al. 2012; Rogers et al. 2011); several studies show that investor sentiment influences stock returns (e.g. Baker and Wurgler 2006; Yu and Yuan 2011). Blau et al. (2015) add to this literature and find that managers are unable to maintain a prolonged overvaluation of their stock by striking an overly optimistic posture in interactive conference call disclosures. Research shows that managers use language in earnings press releases to convey signals regarding future expectations and that the market, broadly defined, responds to linguistic signals (Davis et al. 2015); they tend to increase the use of optimistic language in earnings press releases when they feel it is to their advantage (Davis and Tama-Sweet 2012).

Some studies provide evidence of the impact of COVID-19 on investors and financial markets and contribute to the evolving literature on the economic and financial effects of COVID-19. Ashraf (2020) provides evidence of a correlation between growth in COVID-19 and poor stock market performance across 64 countries. Using event study analysis of key COVID-19 milestones, Heyden and Heyden (2021) find a negative impact on international stock markets. Baek et al. (2020) find that changes in volatility are more sensitive to COVID-19 news than are economic indicators. Extending this field of research, Louhichi et al. (2026) provide international evidence of the impact of pandemic-related news on stock market volatility. Narayan et al. (2020) find that lockdowns, travel bans, and economic stimulus packages all had a positive effect on stock markets, with lockdowns being the most effective in cushioning the effects of COVID-19. Looking at the period February-April 2020, Baker et al. (2020) find that the news related to COVID-19, both positive and negative, have driven large daily US stock markets movement. Earnings announcements represent the most visible and timely channel for managers to communicate quarterly operational performance, and there is strong evidence that the market uses qualitative information from earnings announcements to infer managers' private information about firms' prospects and value (DeBoskey et al. 2019; Henry 2008; Price et al. 2012). Zhang et al. (2020) note a substantial increase in global financial market risks in response to the pandemic and that stock market reactions are linked to the severity of the outbreak in each country. Further evidence indicates that COVID-19 also influences analysts' stock recommendation (Jia et al. 2026) and has had a variable effect across firms, but the effect differs across industries and countries (Szczygielski et al. 2022).

During crisis period, like the COVID-19 pandemic, investors often grapple with heightened uncertainty and volatility. In such environments, positive signals from firms can significantly impact investor sentiment, fostering greater confidence in a company's ability to withstand challenges and secure future growth. When unexpected events occur, market participants rely on information provided to them by firms to determine how an event is likely to impact firms' prospects (Benton et al. 2022). An optimistic tone in earnings calls could convey resilience, suggesting that the firm has a clear plan to navigate current challenges and capitalize on emerging opportunities. Literature suggests that investors are more likely to react favourably to optimistic communication, especially when clarity and reassurances are scarce during times of crisis. Davis et al. (2015) highlights the relationship between the tone of earnings calls and short-term market reactions, emphasizing how tone influences immediate investor sentiment. Similarly, Xi et al. (2021) present evidence that conference call tone also plays a forward-looking role, providing insights into long-term corporate outcomes and signalling strategic directions that influence market perceptions over time. Using computerized textual analysis of UK annual report narratives, Bassyouny and Abdelfattah

(2022) find that corporate narrative tone predicts future performance, with the predictive power concentrated in executives' reporting tone rather than governance tone. Moreover, in times of crisis, investors seek transparency and proactive communication from firms. A positive tone not only suggests optimism but can also signal that the company is effectively managing the crisis, which may enhance trust and foster a more favourable investor outlook. Transparent and optimistic communication is crucial during times of instability, as investors are more likely to back companies that they believe are well-prepared to navigate difficult circumstances. We expect that firms projecting optimism, during crisis, are more likely to see favourable market reactions due to increased investor confidence and trust.

H2: A more positive tone in firms' earnings calls during an economic crisis is associated with higher abnormal market returns.

2.5 Communication strategies: ESG vs. tone

We theorise the disclosure strategies that firms have adopted during the COVID-19 outbreak and develop an analytical framework based on two dimensions. The first dimension refers to the level of non-financial performance of a company; this dimension reflects the crucial role of firms' ESG performance in mitigating financial risk during crisis periods (Broadstock et al. 2021; Busco et al. 2019; Lööf et al. 2021) and for understanding investors' reactions in the new era of COVID-19 (Díaz et al. 2021). Further, ESG performance can be considered as a form of company's reputation as stakeholders, including consumers, investors, and regulators, use ESG performance as a benchmark for assessing the firm's ability to deliver long-term value (Lange et al. 2011). The second dimension captures the tone in the earnings calls; indeed, companies can use disclosure to disseminate a different image of their company and skew the disclosure tone more positively than what is justified (Davis and Tama-Sweet 2012; Melloni et al. 2017). These two dimensions (ESG and tone) help entangle four communication strategies adopted by firms; during the crisis, a company may have chosen to implement a specific disclosure strategy that seemed adequate to reassure stakeholders (see Fig. 1).

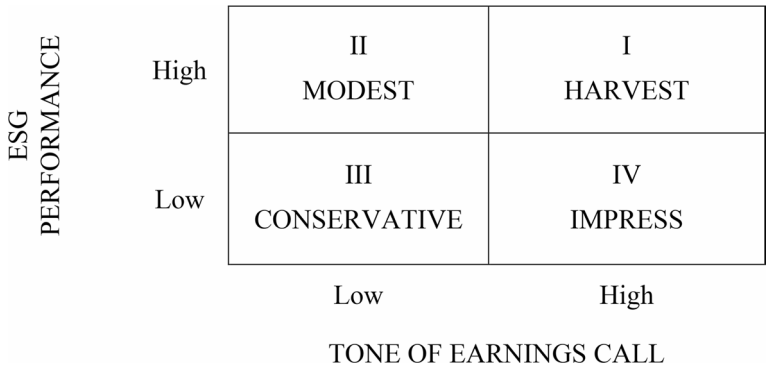

Fig. 1 Communication strategies during the COVID-19 pandemic. This figure provides a representation of the four corporate communication strategies across the two dimensions of ESG performance and tone of earnings conference calls

HARVEST (I) The upper right quadrant of Fig. 1 represents the Harvest strategy, which is based on high ESG performance levels and a more positive tone in earnings calls. It occurs when companies, on the basis of strong ESG performance, are confident about reaping or harvesting a positive self-image by projecting a positive outlook about their ability to handle uncertainties and challenges in the business ecosystem and to anticipate future earnings potential. ESG performance reinforces management confidence and empowers them to handle lofty and challenging future goals. This corporate communication strategy aims to provide information to legitimise corporate actions and can be considered a proactive strategy used to maintain or improve organisational legitimacy.

MODEST (II) The upper left quadrant of Fig. 1 shows the Modest strategy, characterised by high ESG performance and a lower positive tone in the call. In this strategy, firms are modest about their outlook, are cautious in their communication with stakeholders, and tend to prepare or defend against future uncertainty or negative outcomes. These firms may anticipate being hit hard by the crisis and may be cautious because their managers perceive the negative impact of uncertainty on future performance. Overall, these firms are humble in their communication by choice rather than due to their ESG performance. The Modest corporate communication strategy could be considered a repair strategy and a reactive response to an unforeseen crisis of meaning (Suchman 1995).

CONSERVATIVE (III) The lower left quadrant of Fig. 1 shows the Conservative strategy, characterised by a lower level of ESG performance and a lower level of positive tone. It occurs when a company provides cautious communication to stakeholders, conditioned by weaker ESG performance rather than by choice. These firms may have been (or anticipate being) particularly affected by the crisis and are therefore conservative and realistic in their disclosure approach. Similarly, they may lack an incentive to communicate their expectations with more optimism as this may not correspond to their outlook, and they may want to be honest with investors. The Conservative corporate communication strategy aims to maintain an organisation's level of current legitimacy.

IMPRESS (IV) The lower right quadrant of Fig. 1 shows the Impress strategy, characterised by a lower level of ESG performance coupled with a more positive tone. In this strategy, firms present a more promising image of their outlook, even in the presence of lower ESG performance. This is a strategy aimed at impressing stakeholders, where managers tend to limit focus on negative news about their firm's performance while emphasising a more positive outlook about the future. This form of corporate communications strategy aims to influence people's perceptions by enhancing a company's image to create a competitive advantage for the firm. By inflating the tone of their communication, firms in this quadrant see an incentive to communicate their future expectations in a good light or may be encouraged to present a positive twist, as they perceive that this may help compensate for the lower ESG performance and be positively perceived by market participants.

Prior research documents a link between ESG performance and tone in corporate communications. Albitar et al. (2023) show that higher ESG disclosure scores are associated with a more positive CSR narrative tone among UK firms. Li et al. (2024b) demonstrate that firms strategically manage tone in ESG reports as an impression management tool, potentially

masking future ESG risks. Similarly, Yang et al. (2025) find that managers in firms with strong ESG performance adopt an overly positive tone, partly driven by equity-based compensation incentives and the desire to influence analyst perceptions. Further evidence suggests that uncertainty surrounding ESG assessments can itself encourage managerial tone manipulation, as firms facing greater ESG rating disagreement are more likely to engage in tone management to respond to market pressure and investor uncertainty (Chen and Wang 2025). These findings suggest that ESG and tone are intertwined, making the examination of corporate communications a relevant avenue for understanding managerial behaviour. Extending this line of inquiry to periods of economic crisis offers novel insights, as such contexts may alter incentives and reveal whether tone management differs across firms with varying ESG performance.

3 Methodology

3.1 Sample and data

The sample for this study includes the companies listed in the STOXX Europe 600 index as of 1st July 2020. We source the transcripts of quarterly earnings conference calls from LSEG Workspace, which includes 11,186 English language earnings calls from 1st March 2020 to 30th June 2020. We include only calls in which 'COVID-19' or a synonym such as 'sarscov', 'coronavirus', 'corona virus', 'ncov', or 'covid' is mentioned at least once in the transcript (Hassan et al. 2023) to ensure that the calls are relevant to the COVID-19 outbreak. This process leads to a final sample of 264 firms that have at least one call transcript available during the first wave of the pandemic (*COVID*) as reported in Table 1. Our timeline for analysis is inspired from the development of COVID-19 in Europe: by 1st March 2020, most countries in Europe reported their first confirmed cases of COVID-19 and the WHO European region collectively had over 1,000 reported cases; further, we limit our timeline to 30th June 2020 to effectively capture the earnings calls in the first wave of the pandemic for the firms in our sample. Table 2 presents the distribution of the sample across countries and industries. To enable a comparative evaluation, we analyse the calls for the same firms in the previous year and identify 256 firms for which a call transcript is available in the previous year for the same period (*PRE-COVID*). We collect firm specific variables from Datastream, Bloomberg, and LSEG Workspace.

Table 1 Sample selection process. This table provides details of the sample selection process. The sample draws from STOXX Europe 600 index, for the period from 1st March to 30th June 2020 that represents the first wave of the COVID-19 pandemic. We applied a variety of screening tools which lead to a final sample of 264 (*COVID*) and 256 (*PRE-COVID*) as detailed below:

Criteria	Count
Earnings calls for the period 1st Mar to 30th Jun 2020	11,186
Removing duplicates from multiple sources	5,950
Earnings calls limited to firms in the STOXX 600 index as of 1st Jul 2020	320
Calls with COVID-19 mentioned / First earnings calls during the period	284
Call transcript that was readable / downloadable (*COVID*)	264
Call transcript from previous year for the same firms (*PRE-COVID*)	256

Table 2 Sample distribution. This table reports descriptive statistics of the sample distribution. The *COVID* sample is composed of 264 companies based in 18 European countries (Panel A) and belonging to 11 single-digit ICB (Panel B). Others^{+} includes Austria, Belgium, Cyprus, Ireland, Luxembourg, Norway, Poland, and Portugal

Panel A: Country			Panel B: Industry		
Country	Count	% age	Sector	Count	% age
Germany	43	16.3%	Industrials	52	19.7%
United Kingdom	40	15.2%	Financials	40	15.2%
Sweden	39	14.8%	Consumer Discretionary	27	10.2%
France	21	8.0%	Health Care	27	10.2%
Italy	21	8.0%	Basic Materials	20	7.6%
Denmark	17	6.4%	Real Estate	18	6.8%
Switzerland	16	6.1%	Technology	18	6.8%
Netherlands	14	5.3%	Consumer Staples	17	6.4%
Spain	12	4.5%	Telecommunication	17	6.4%
Finland	11	4.2%	Utilities	16	6.1%
Others^{+}	30	11.4%	Energy	12	4.5%
Total	264	100.0%	Total	264	100.0%

3.2 Model specification: ESG performance and tone of earnings calls

To examine the relationship between firms' ESG performance and the tone of earnings conference calls, we estimate the following regression analysis (Eq. 1):

$$TONE_H = \alpha + \sum_1^k \beta_k ESG_k + \sum_1^l \gamma_l ESG_l * COVID + \sum_1^m \delta_m CONTROL_m + e \quad (1)$$

The dependent variable is the tone ($TONE_H$) of the earnings call, estimated for each firm and each transcript. We conduct a comprehensive content analysis of call transcripts using DICTION software, focusing on tone and stylistic attributes (Henry 2008; Loughran and McDonald 2015; Patelli and Pedrini 2014), and use the custom dictionary of word lists defined in Henry (2008), specifically built for earnings press releases, to define our primary measure of tone *($TONE_H$)*. For robustness checks, we employ the custom dictionary of word lists defined in Loughran and McDonald (2015) to estimate an alternative measure of tone ($TONE_{LM}$), typically used for form 10-Ks (DeBoskey et al. 2019). Within content analysis techniques, extracting the linguistic tone of a narrative using word count strategies helps ascertain the hidden meaning or themes of the communication; by isolating the tone, we move beyond the analysis of *what* is being said to *how* it is being said. Textual analysis techniques are well-established and widely used across disciplines, and their application to financial research has witnessed an upsurge in the last decade.

The independent variable is ESG performance (*ESG*). We use the ESG scores from LSEG Workspace to measure a company's overall ESG performance (*ESG*), and its subcomponent in terms of environmental (*ENV*), social (*SOC*), and corporate governance (*GOV*) pillars. ESG performance score ranges between 0 and 100 and reflect a company's overall performance on the environmental, social, and governance pillars. Four variations *(k)* of the independent variable ESG (*ESG*, *ENV*, *SOC*, and *GOV* separately) are tested together with interaction terms *(ESG X COVID)* between ESG performance and *COVID*, a dummy variable equal to 1 during the COVID-19 period and 0 otherwise.

CONTROL is a vector of *m* firm-specific variables. We control for a number of firms' financial variables: return on assets (*ROA*), leverage (*LEV*), market capitalization (*MKT_CAP*), to control for profitability, capital structure, and firm size. Further we control for managerial opportunism (*OPP*) estimated as the level of abnormal or discretionary accruals using cross-sectional regressions by year and 2-digit SIC code (Ibrahim and Lloyd 2011), and earnings surprise (*EPS_SURP*) calculated as the percentage difference between the BEst (Bloomberg Estimate) mean EPS estimate and the actual EPS (Prasad and Prabhu 2020). We also control for the length of the call transcript (*LENGTH*) and the industry (*IND_D*) in which the firm operates using two-digit SIC code dummy variables. All the variables are presented in Table 3.

To address endogeneity in the main regression model, a one-period lag of the independent variables is incorporated. Initially, we perform an ordinary least squares regression. As robustness checks, we re-estimate the model using alternative approaches, including a two-stage least squares (2SLS) model with instrumental variables, the Heckman two-stage method, and a difference-in-differences estimation, to account for potential endogeneity biases.

Table 3 Variables. This table reports definitions and reference/source of the variables used in the empirical analysis

Category	Label	Definition	Reference/ Source
Stylistic attributes	*OPTIMISM*	Language highlighting positive entailments. Estimated as [*PRAISE*+*SATISFACTION*+*INSPIRATION*] – [*BLAME*+*HARDSHIP*+*DENIAL*]	DICTION software, Patelli and Pedrini (2014)
	PRAISE	Percentage of words in the earnings call that are affirmations of some person, group, or abstract entity. Included are terms isolating important social qualities (dear, delightful, witty), physical qualities (mighty, handsome, beautiful), intellectual qualities (shrewd, bright, vigilant, reasonable), entrepreneurial qualities (successful, conscientious, renowned), and moral qualities (faithful, good, noble).	DICTION software, Patelli and Pedrini (2014)
	SATISFACTION	Percentage of words in the earnings call that are terms associated with positive affective states (cheerful, passionate, happiness), with moments of undiminished joy (thanks, smile, welcome) and pleasurable diversion (excited, fun, lucky), or with moments of triumph (celebrating, pride, auspicious). Also included are words of nurturance: healing, encourage, secure, relieved.	DICTION software, Patelli and Pedrini (2014)
	INSPIRATION	Percentage of words in the earnings call that are abstract virtues deserving of universal respect. Most of the terms in this dictionary are nouns isolating desirable moral qualities (faith, honesty, self-sacrifice, virtue) as well as attractive personal qualities (courage, dedication, wisdom, mercy). Social and political ideals are also included: patriotism, success, education, justice.	DICTION software, Patelli and Pedrini (2014)
	BLAME	Percentage of words in the earnings call that are terms designating social inappropriateness (mean, naive, sloppy, stupid) as well as downright evil (fascist, blood-thirsty, repugnant, malicious). In addition, adjectives describing unfortunate circumstances (bankrupt, rash, morbid, embarrassing) or unplanned vicissitudes (weary, nervous, painful, detrimental) are included. The dictionary also contains outright denigrations: cruel, illegitimate, offensive, miserly.	DICTION software, Patelli and Pedrini (2014)
	HARDSHIP	Percentage of words in the earnings call that are in the dictionary containing natural disasters (earthquake, starvation, tornado, pollution), hostile actions (killers, bankruptcy, enemies, vices) and censurable human behaviour (infidelity, despots, betrayal). It also includes unsavoury political outcomes (injustice, slavery, exploitation, rebellion) as well as normal human fears (grief, unemployment, died, apprehension) and in capacities (error, cop-outs, weakness).	DICTION software, Patelli and Pedrini (2014)
	DENIAL	Percentage of words in the earnings call that are in the dictionary consisting of standard negative contractions (aren't, shouldn't, don't), negative functions words (nor, not, nay), and terms designating null sets (nothing, nobody, none).	DICTION software, Patelli and Pedrini (2014)
	WORDS	Total number of words in the earnings conference call transcript.	DICTION software, Patelli and Pedrini (2014)

Table 3 (continued)

Category	Label	Definition	Reference/ Source
	LENGTH	Natural log of total words analysed.	DICTION software, Patelli and Pedrini (2014)
	% LM POS	Percentage of words in the earnings call that are in Loughran and McDonald's positive word list. Examples of positive words include greater, effective, gain, and improvements.	Loughran and McDonald (2015)
	% LM NEG	Percentage of words in the earnings call that are in Loughran and McDonald's negative word list. Examples of negative words include losses, impairment, adverse, bankruptcy, and closed.	Loughran and McDonald (2015)
	$TONE_{LM}$	Estimated as the *% LM POS* minus the *% LM NEG*	Loughran and McDonald (2015)
	% H POS	The count of positive words in text portion of press release scaled by total words in the text portion.	Henry (2008)
	% H NEG	The count of negative words in text portion of press release scaled by total words in the text portion.	Henry (2008)
	$TONE_{H}$	Estimated as *(% H POS – % H NEG) ÷ (% H POS + % H NEG)*.	Henry (2008)
Environment, Social and Governance	*ESG*	Overall company score based on the self-reported information in the environmental, social, and corporate governance pillars.	Datastream, Bloomberg and LSEG Workspace
	ENV	Overall company score based on the self-reported information in the environmental pillar.	Datastream, Bloomberg and LSEG Workspace
	SOC	Overall company score based on the self-reported information in the social pillar.	Datastream, Bloomberg and LSEG Workspace
	GOV	Overall company score based on the self-reported information in the corporate governance pillar.	Datastream, Bloomberg and LSEG Workspace
Firm characteristics	*ROA*	Return on assets	Bloomberg
	MKT_CAP	Natural log of market capitalisation.	Bloomberg
	LEV	Debt to equity ratio.	Bloomberg
	OPP	Managerial opportunism estimated as the level of abnormal or discretionary accruals using cross-sectional regressions by year and 2-digit SIC code.	Bloomberg, Ibrahim and Lloyd (2011)

Table 3 (continued)

Category	Label	Definition	Reference/ Source
	EPS_SURP	The earnings per share percent surprise is calculated as the percentage difference between the BEst (Bloomberg Estimate) mean EPS estimate for the most recent year and the actual EPS.	Bloomberg, Prasad and Prabhu (2020)
	NEWS	Press coverage estimated as the count of news articles published in LSEG Workspace for the respective event window of analysis.	LSEG Workspace
	ENV_INNOV	Environmental innovation score reflects a company's capacity to reduce the environmental costs and burdens for its customers and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products.	LSEG Workspace
	WORKFORCE	Workforce score measures a company's effectiveness towards job satisfaction, healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.	LSEG Workspace
	ASSET_GR	Growth rate of assets.	Bloomberg
	PPE	Tangible assets as a proportion of total assets.	Bloomberg
Communication strategy	*HARVEST*	Dummy variable equal to 1 when $TONE_H$ and *ESG* are higher than sample median, and 0 otherwise.	Authors' estimates
	MODEST	Dummy variable equal to 1 when $TONE_H$ is lower and *ESG* is higher than sample median, and 0 otherwise.	Authors' estimates
	CONSERVATIVE	Dummy variable equal to 1 when $TONE_H$ and *ESG* are lower than sample median, and 0 otherwise.	Authors' estimates
	IMPRESS	Dummy variable equal to 1 when the $TONE_H$ is higher and *ESG* is lower than sample median, and 0 otherwise.	Authors' estimates

3.3 Model specification: stock market reaction to earnings calls

As a further step in the analysis, we examine market reaction to earnings calls using event study methodology. Beyond the internal implications of past ESG performance on the tone of earnings conference calls, we explore how financial markets react to companies' communication strategies and whether ESG performance serves as an indicator of share price resilience.

For each firm, the market reaction is measured by the cumulative abnormal return (*CAR*) using an event study methodology detailed in Pereira et al. (2019). We also estimate cumulative average abnormal return (*CAAR)* for the period $\{t_1, t_2\}$ across a variety of long and short event windows ranging from 1 day [0] to 41 days [-20,+20] for event analysis. Parametric tests (Boehmer et al. 1991; Patell 1976) are applied to evaluate the statistical significance of *CAAR.*

Further, we test for causality between the tone of earnings calls and investors' reactions. We examine the effect of tone on *CAR* (t_1, t_2) in Eq. (2):

$$\begin{gathered} CAR\,(t_1, t_2) = \alpha + \beta\, TONE_H + \gamma\ TONE_H * \\ COVID + \sum_1^m \delta_m CONTROL_m + e \end{gathered} \tag{2}$$

The dependent variable is the cumulative abnormal returns (*CAR)*. We use various specifications of the dependent variable ranging from a 1-day to a 41-day event window; thus, *CAR [0]*, *CAR [0,+1]*, *CAR [-1,+1]*, *CAR [-3,+3]*, *CAR [-5,+5]*, *CAR [-10,+10]*, and *CAR [-20,+20]*. The main independent variable in Eq. 2 is the tone ($TONE_H$) of the earnings call, estimated for each firm and transcript, following Henry (2008). COVID is a dummy variable equal to 1 during the COVID-19 period and 0 otherwise. *CONTROL* is a vector of *m* firm-specific variables.

In Eq. 3, we assess the effect of corporate communication strategies adopted by firms on cumulative abnormal returns *CAR* (t_1, t_2):

$$\begin{gathered} CAR\,(t_1, t_2) = \alpha + \beta_1 HARVEST + \beta_2 MODEST + \\ \beta_3 CONSERVATIVE + \beta_4 IMPRESS + \gamma_1 HARVEST * \\ COVID + \gamma_2 MODEST * COVID + \gamma_3 CONSERVATIVE * \\ COVID + \gamma_4 IMPRESS * COVID \\ + \sum_1^m \delta_m CONTROL_m + e \end{gathered} \tag{3}$$

The dependent variable is the cumulative abnormal returns (*CAR)*. The independent variables are *HARVEST*, *MODEST*, *CONSERVATIVE*, and *IMPRESS*, dummy variables equal to 1 depending on where the firm falls within the 2 × 2 distribution matrix of ESG and tone of earnings call and 0 otherwise (See Sect. 2.5).

For both Eqs. (2) and (3), *CONTROL* is a vector of *m* firm-specific variables (*ROA*, *MKT_CAP*, *LEV*, *NEWS*) that control for profitability, firm size, capital structure, and press coverage, respectively (De Villiers and Marques 2016). Additionally, industry effects are accounted for using two-digit SIC code dummy variables.

4 Findings

4.1 Stylistic attributes of earnings calls

Table 4 presents the descriptive statistics of the stylistic attributes of earnings calls during the *COVID* and *PRE-COVID* periods and the results of a two-sample t-test that compares if the group means are significantly different. The findings show that firms' earnings calls in the *COVID* period are characterised by significantly fewer nouns expressing desirable moral and attractive personal qualities (*INSPIRATION*) and more words expressing unsavoury outcomes and normal human fear (*HARDSHIP*). The overall effect of a significantly lower proportion of words expressing positive entailments and a significantly higher proportion of words expressing negative entailments results in a lower level of optimism (*OPTIMISM*) in calls during *COVID* compared to *PRE-COVID*. Earnings calls during the *COVID* period are also significantly wordier (*WORDS*), thus providing more information and discussion. Further, calls in the *COVID* period have a higher percentage of negative words (*% H NEG*, *% LM NEG)* than positive words (*% H POS*, *% LM POS)*, leading to an overall tone ($TONE_H$, $TONE_{LM}$) that is significantly more negative in the *COVID* period than in the previous year. Our results are consistent with Hassan et al. (2023), who document that COVID-19 was not only bad news for firms but also exposed managers to significantly greater uncertainty.

For the earnings calls identified during the *COVID* period ($N=264$), we plot the earnings call tone ($TONE_H$) on a 2×2 matrix using firms' ESG performance as the second dimension, to investigate how companies modulate the tone of their earnings calls *vis-à-vis* their ESG performance level (see Fig. 2). Using a sample median split across the two dimensions (*ESG* vs. *Tone*), we group the firms into four clusters: *HARVEST*, *MODEST*, *CONSERVATIVE*, and *IMPRESS*, as detailed in Section 2.5. Figure 2 shows the distribution of the sample firms across the four groups for the *COVID* period.[2]

4.2 ESG and tone of earnings calls

Table 5 reports the results of the OLS regression investigating the relationship between ESG performance and tone for the whole sample (*COVID* and *PRE-COVID*). Two variations of the dependent variable are used – $TONE_H$ (Panel A) and $TONE_{LM}$ (Panel B); ESG performance is introduced as an independent variable (*ESG*) as well as *ENV*, *SOC* and *GOV* separately, and we introduce interaction terms between each non-financial performance variable and the *COVID* dummy. We find a strong negative significant result, which is consistent across both variations of *Tone* ($TONE_H$ *and* $TONE_{LM}$), for *ESG* as well as for each component of *ESG* supporting our first research hypothesis (*H1*). We note that one unit increase in ESG leads to 0.09% increase in the negativity of tone for the full sample which becomes more pronounced (0.22%) and significant during the *COVID* period. This result indicates that firms with lower levels of non-financial performance display a more positive tone during periods of crisis and vice versa, supporting the *Modest* and *Impress* communication strategies. There seems to be some evidence of impression management in the context of ESG performance, wherein management tends to report in a more positive light in presence of weaker non-financial performance. Contrary to the findings of Yang et al. (2025),

[2] In a subsequent comparative evaluation, we undertake a similar median split approach for earning calls ($N=256$) in the *PRE-COVID* period across the two dimensions of *ESG* and *Tone*.

Table 4 Descriptive statistics. This table reports descriptive statistics of stylistic attributes of earnings conference calls for the *COVID* and *PRE-COVID* periods. Variables are described in Table 3. Two sample t-test significance results from comparison of means are reported with *, **, *** denoting significance at 10%, 5%, and 1% levels, respectively

Reference		COVID					PRE-COVID					t-test
	Variables	*N*	Mean	Median	Min	Max	*N*	Mean	Median	Min	Max	sig
Patelli and Pedrini (2014)	*OPTIMISM*	264	50.96	50.92	48.04	54.60	256	51.23	51.09	48.49	55.35	***
	PRAISE	264	4.55	4.19	0.60	10.24	256	4.81	4.50	1.40	12.09	
	SATISFACTION	264	3.77	3.67	0.73	8.07	256	3.75	3.44	0.63	9.12	
	INSPIRATION	264	1.48	1.27	0.05	7.31	256	1.77	1.47	0.02	6.76	***
	BLAME	264	0.88	0.76	0.00	4.40	256	0.85	0.65	0.00	7.56	
	HARDSHIP	264	1.33	1.08	0.07	6.60	256	0.97	0.75	0.00	7.74	***
	DENIAL	264	3.76	3.48	0.73	11.61	256	3.57	3.28	0.50	9.31	
	TOTAL WORDS	264	10,147	9,811	2,305	22,218	256	8,499	8,278	851	21,156	***
Henry (2008)	*% H POS*	264	1.99	1.93	0.89	4.60	256	2.52	2.43	1.06	5.54	***
	% H NEG	264	0.79	0.75	0.22	2.08	256	0.63	0.60	0.16	1.62	***
	$TONE_H$	264	0.43	0.45	-0.06	0.82	256	0.59	0.60	0.22	0.92	***
Loughran and McDonald (2015)	*% LM POS*	264	3.73	3.39	0.38	11.10	256	4.25	3.89	0.94	12.96	***
	% LM NEG	264	5.30	5.04	1.61	13.38	256	4.48	4.10	0.80	11.19	***
	$TONE_{LM}$	264	-1.57	-1.86	-9.48	6.33	256	-0.23	-0.31	-8.64	9.47	***

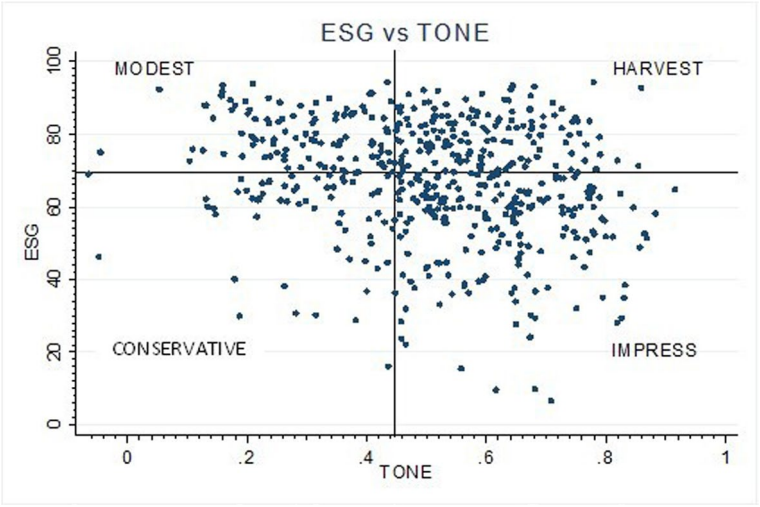

Fig. 2 ESG vs. tone of the earnings call during the COVID-19 pandemic. This figure shows the distribution of firms across the 2 × 2 matrix of ESG and the tone of earnings calls for firms listed on the STOXX Europe 600 index during the *COVID* period

documenting that managers in firms with strong ESG performance are inclined to adopt an overly positive tone driven by vested interests in equity-based compensation, our results show that during periods of economic crisis firms with lower levels of ESG performance display a more positive tone.

By finding a negative relationship between ESG performance and tone, these results are in line with the literature documenting the role of firm reputation as a liability (Rhee and Haunschild 2006). High reputation firms are subject to higher scrutiny from stakeholders; in presence of higher reputation, i.e. higher ESG performance, managers would use a more negative tone during crisis to maintain credibility; lower reputation firms would instead use a more positive tone to project a more positive outlook. We find new evidence that the tone of communication is driven by past non-financial performance levels during crisis and add to the literature on the value relevance of non-financial information as a driver of managerial tone in earnings calls.

Differently from previous studies that document the benefits of firm reputation (Love and Kraatz 2009; Park and Rogan 2019; Pfarrer et al. 2010; Timothy Coombs and Holladay 2006) and show a positive association between ESG performance, risk reduction, financial performance (i.e., Broadstock et al. 2021; Cornett et al. 2016; Hoepner et al. 2024), our findings show that ESG performance does not itself boost a more positive tone. Instead, it serves as a liability for companies during crisis: this would explain that, in presence of high ESG, companies disclose a less positive tone as they are subject to higher scrutiny and expectations from stakeholders (*Modest*). In presence of low ESG, companies disclose a more positive tone to compensate for the lower reputation (*Impress*). As such, the level of ESG determines the tone of the communication that companies adopt during crisis to reassure their stakeholders. The negative relationship between ESG performance and tone, combined with non-significant financial performance, highlights the role of corporate communication in reassuring stakeholders in presence of lower ESG performance, while it seems to exclude

Table 5 ESG performance and tone: regression results. This table reports the results of the OLS regressions on the causal relationship between ESG and tone (Eq. 1). The robust standard errors are reported in brackets. Two variations of the dependent variable are tested - $TONE_H$ (Panel A) and $TONE_{LM}$ (Panel B). Variables are described in Table 3. *, **, *** denote significance at 10%, 5%, and 1% levels, respectively

Panel A: Dependent variable $TONE_H$					Panel B: Dependent variable $TONE_{LM}$			
Variables	I	II	III	IV	I	II	III	IV
ESG	-0.0009*				0.0045			
	(0.0005)				(0.0102)			
ESG X COVID	-0.0022***				-0.0183***			
	(0.0002)				(0.0043)			
ENV		-0.0006*				0.0035		
		(0.0004)				(0.0074)		
ENV X COVID		-0.0022***				-0.0174***		
		(0.0002)				(0.0043)		
SOC			-0.0008*				0.0025	
			(0.0005)				(0.0086)	
SOC X COVID			-0.002***				-0.0173***	
			(0.0002)				(0.0041)	
GOV				0.001**				0.015**
				(0.0004)				(0.0076)
GOV X COVID				-0.0021***				-0.0193***
				(0.0002)				(0.0046)
ROA	0.0001	0.0003	0.0001	0.0005	0.0202	0.0208	0.0193	0.0226
	(0.0009)	(0.001)	(0.0009)	(0.0009)	(0.0177)	(0.0175)	(0.0177)	(0.0169)
LEV	0.0071	0.0076	0.0083	0.0067	-0.1313	-0.1293	-0.127	-0.1266
	(0.007)	(0.0068)	(0.0072)	(0.0066)	(0.1607)	(0.1639)	(0.1621)	(0.1547)
LENGTH	-0.0271	-0.0287	-0.0309	-0.0241	0.1075	0.0711	0.0886	0.1121
	(0.0219)	(0.0218)	(0.0224)	(0.0216)	(0.5734)	(0.5699)	(0.5726)	(0.5777)
MKT_CAP	0.0067	0.0094	0.0092	-0.0088	0.138	0.1557	0.1621	0.092
	(0.0067)	(0.0094)	(0.0092)	(-0.0088)	(0.138)	(0.1557)	(0.1621)	(0.092)
OPP	0.0258	0.046	0.0304	0.1099	-5.3135	-5.293	-5.2518	-4.8964
	(0.207)	(0.2032)	(0.1992)	(0.1911)	(3.7685)	(3.6941)	(3.8241)	(3.5958)

Table 5 (continued)

Panel A: Dependent variable $TONE_H$					Panel B: Dependent variable $TONE_{LM}$			
Variables	I	II	III	IV	I	II	III	IV
EPS_SURP	0.0001	0.0001	0.0001	0.0001	0.0031**	0.0031**	0.003**	0.0033***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
constant	0.705***	0.6426***	0.6912***	0.8081***	-5.0362	-5.0174	-5.1318	-4.9882
	(0.2247)	(0.2266)	(0.2273)	(0.2267)	(4.7327)	(4.7085)	(4.7508)	(4.7258)
N	345	345	345	345	345	345	345	345
Adj. R square	35.11%	36.45%	35.09%	30.60%	10.52%	9.98%	10.61%	10.69%
Industry control	Y	Y	Y	Y	Y	Y	Y	Y

the role of financial performance as a buffer that could affect the tone and help firms withstand the crisis. These results are consistent across the two measures of tone indicating the robustness of the outcomes.[3]

4.3 Market reaction to earnings calls

In addition to studying earnings calls from a company's internal perspective by investigating the relationship between the tone of the earnings calls and ESG performance, we also analyse how the language used in the earnings calls is perceived externally, thus determining whether a company's communication achieves its purpose of reassuring investors and financial markets. Table 6 reports the results of the OLS regression investigating the causal relationship between earnings call tone and market reaction for both the *COVID* and *PRE-COVID* periods. $TONE_H$ is not significant across the entire period of analysis, indicating tone might not be a significant driver of abnormal returns when controlling for other firm level factors. However, tone is significant and positive during the *COVID* period, as evident from the interaction term $TONE_H X\ COVID$ confirming our second research hypothesis (*H2*).[4] As the level of positivity in $TONE_H$ increases by one unit the abnormal return following the earnings call release increases by 2.34% on the day of the announcement [0] during the *COVID* period, suggesting more positive the tone of the calls, the more positive the market reaction observed across both short (1 day) and long (41 days) event windows during period of economic crisis.

In Table 7, we regress the various communication strategies adopted by the firm on the abnormal market return for the *COVID* and *PRE-COVID* period collectively. The interaction term *IMPRESS X COVID*, measuring the effect of adopting an *Impress* strategy during the *COVID* period, is positive and strongly significant across all event windows. Hence, from Table 7, we note that firms that adopt the *Impress* strategy have significantly higher market returns during the *COVID* period than firms that adopt the other communication strategies, which becomes much higher when considering longer event windows.[5] Firms that adopt an *Impress* communication strategy have 1.49% higher abnormal return on the day of the announcement during the COVID period, which becomes much higher (4.09% for [-20,+20]) when considering longer event windows. The significant outcome for *IMPRESS* illustrates the role of the non-financial performance level and the subsequent communication strategy adopted by firms in affecting stock markets during times of crisis. The positive relationship between tone and market returns, combined with the non-significant financial performance, suggests the role of corporate communication in reassuring investors and market participants in the presence of lower ESG performance during times of crisis, while it seems to exclude the role of financial buffers that could help firms weather the crisis.

Our findings contribute to previous literature debating market dynamics during the COVID-19 pandemic (Ozik et al. 2021). Companies projecting a positive outlook, even with lower ESG performance, may signal strong leadership and effective crisis manage-

[3] To further validate the findings, we investigate the relationship between firms' ESG performance and the tone of the earnings calls using an alternative control for the level of a firm's financial performance, return on equity. The results (not reported here but available upon request) are consistent with the earlier findings.

[4] As a robustness test, we repeat the analysis using an alternate measure of tone ($TONE_{LM}$). The results (not reported here but available on request) are consistent with our main observations.

[5] The *MODEST* dummy drops out of the model to avoid dummy variable trap.

Table 6 Tone of earnings calls and market reaction: regression analysis. This table reports the results of the OLS regressions on the causal relationship between tone and cumulative abnormal return (*CAR*) (Eq. 2). The robust standard errors are reported in brackets. Variables are described in Table 3. *, **, *** denote significance at 10%, 5%, and 1% levels, respectively

Dependent variable CAR							
Variables	[0]	[0,+1]	[-1,+1]	[-3,+3]	[-5,+5]	[-10,+10]	[-20,+20]
$TONE_H$	164.523	117.659	115.754	281.713*	209.683	225.888	-354.182
	(100.222)	(131.31)	(131.265)	(156.591)	(172.326)	(209.194)	(265.493)
$TONE_H$X *COVID*	234.6***	262.458***	266.933***	353.06***	339.127***	472.235***	340.254*
	(72.222)	(97.374)	(97.573)	(111.788)	(127.118)	(154.425)	(187.739)
ROA	-2.027	-6.32	-6.285	-5.562	-1.574	-3.692	-1.786
	(3.25)	(4.19)	(4.182)	(4.236)	(3.964)	(5.259)	(6.569)
MKT_CAP	-16.239	-39.298	-41.336	-41.059	-44.496	-22.124	-47.4
	(22.703)	(30.608)	(30.959)	(35.461)	(39.741)	(46.23)	(57.902)
LEV	-15.554	-19.628	-19.654	8.321	22.977	-8.562	-30.994
	(10.592)	(13.438)	(13.458)	(17.415)	(17.573)	(20.695)	(26.483)
NEWS	2.364	1.749	1.534	0.984	1.042	0.526	0.272
	(1.452)	(1.363)	(1.122)	(0.797)	(0.635)	(0.346)	(0.234)
constant	163.509	517.83	545.842	539.554	617.523	246.151	731.106
	(377.178)	(511.493)	(515.612)	(592.751)	(658.553)	(766.628)	(949.847)
N	480	480	480	480	480	480	480
Adj. R square	5.21%	5.59%	5.64%	5.67%	5.73%	6.04%	5.91%
Industry control	Y	Y	Y	Y	Y	Y	Y

Table 7 Communication strategies and market reaction: regression analysis. This table reports the results of the OLS regressions on effect of a particular communication strategy (*HARVEST*, *MODEST*, *CONSERVATIVE* and *IMPRESS*) on *CAR* (Eq. 3). The robust standard errors are reported in brackets. Variables are described in Table 3. *, **, *** denote significance at 10%, 5%, and 1% levels, respectively

Dependent variable CAR							
Variables	[0]	[0,+1]	[-1,+1]	[-3,+3]	[-5,+5]	[-10,+10]	[-20,+20]
HARVEST	31.947	51.065	50.479	136.611	119.072	46.831	-74.036
	(65.065)	(81.885)	(81.688)	(90.202)	(103.47)	(128.642)	(159.443)
CONSERVATIVE	-13.201	-52.333	-51.312	-54.287	-133.632	-198.111	-291.152*
	(68.404)	(82.522)	(82.51)	(97.006)	(114.776)	(143.509)	(166.794)
IMPRESS	31.115	32.388	32.609	46.972	-17.145	-138.074	-194.923
	(55.941)	(71.928)	(71.872)	(90.273)	(97.263)	(119.425)	(151.597)
HARVEST X COVID	69.646	49.847	53.872	68.167	44.055	120.558	15.859
	(82.33)	(104.362)	(104.235)	(108.427)	(124.44)	(162.628)	(201.605)
CONSERVATIVE X COVID	51.545	138.792	141.176	127.134	131.181	170.485	226.915
	(84.8)	(102.044)	(102.188)	(121.506)	(136.202)	(162.331)	(190.186)
IMPRESS X COVID	149.27**	183.295**	184.298**	230.177**	267.725**	426.148***	408.773**
	(63.82)	(87.011)	(86.976)	(106.002)	(116.612)	(133.964)	(170.836)
ROA	-2.034	-6.29	-6.277	-5.281	-1.283	-3.533	-2.388
	(3.261)	(4.19)	(4.185)	(4.231)	(3.939)	(5.128)	(6.279)
MKT_CAP	-12.265	-35.154	-36.69	-43.067	-54.596	-37.842	-51.594
	(24.2)	(32.191)	(32.645)	(36.873)	(41.108)	(49.186)	(61.551)
LEV	-14.3	-18.208	-18.267	10.068	26.326	-4.765	-23.856
	(10.626)	(13.826)	(13.837)	(18.39)	(18.21)	(21.35)	(27.257)
NEWS	2.361	1.825	1.573	0.937	0.986	0.463	0.249
	(1.463)	(1.382)	(1.135)	(0.814)	(0.639)	(0.347)	(0.247)
constant	178.329	501.14	520.645	695.795	906.858	689.398	761.536
	(401.598)	(536.454)	(542.478)	(614.241)	(682.359)	(816.719)	(1019.923)
N	480	480	480	480	480	480	480
Adj. R square	5.12%	6.16%	6.20%	6.12%	6.70%	7.06%	6.72%
Industry control	Y	Y	Y	Y	Y	Y	Y

ment, overshadowing short-term ESG shortcomings (Mottola et al. 2022) and investors seem to focus on financial outcomes over ESG considerations (Li et al. 2024a). Optimism may therefore signal a viable recovery plan, easing concerns about ESG weaknesses. This is corroborated by our results in Table 7, which show that firms with a positive outlook, despite lower ESG performance, are perceived as better positioned, resulting in favourable market reactions. Overall, our findings support the idea that disclosure in the form of earning calls helps to legitimise company behaviour as well as reassure markets.

4.4 Event study analysis

In Table 8, we report the results of the event study methodology to investigate market reactions to the earnings calls held during the *COVID* period (Panel A) and *PRE-COVID* period (Panel B). The analysis is conducted for the overall sample and for firms in each of the four individual clusters (*HARVEST*, *MODEST*, *CONSERVATIVE*, and *IMPRESS*). The cumulative average abnormal return (*CAAR*) is calculated across a range of event windows, and its significance is estimated using parametric test statistics (Boehmer et al. 1991; Patell 1976).

Market reactions following the release of earnings calls provide interesting outcomes. For the *PRE-COVID* period (Panel B) and for the full sample ($N=238$), we note a non-significant market reaction; thus, market participants do not react to the announcements of earning calls. Our findings indicate that earnings calls do not provide further value-relevant information to market participants. However, during the *COVID* period (Panel A) for the same set of firms, there is a significant positive return following the release of earnings calls. This positive significant outcome is consistent across both long and short event windows and highlights the ability of market participants to react to significant company events, more strongly during periods of uncertainty than during normal times.

In Panel B, for the subsample of firms analysed in this study (*HARVEST*, *MODEST*, *CONSERVATIVE*, and *IMPRESS*), we note a significant negative market reaction for the *MODEST* and *CONSERVATIVE* strategies during the *PRE-COVID* period and a significant positive reaction for the *HARVEST* and *IMPRESS* strategies. This seems to indicate that, during normal times, firms with more positive tones are associated with positive market returns, while for firms with less positive tones there is a significant negative abnormal return following the release of earnings calls. Our findings are consistent with those of previous studies, including Price et al. (2012) and Huang et al. (2014). The subsample analysis provides subtle details on the differential market reactions based on a firm's communication strategy, which seem driven primarily by tone: a more positive tone is associated with significantly higher abnormal returns.

Panel A shows that, during the *COVID* period for the same set of firms there is a consistently significant positive market reaction for the *Impress* strategy, while the market reaction is positive for other communication strategies but not always consistently significant across the event windows. This suggests that, during periods of crisis, maintaining a more upbeat and positive tone despite a lower past ESG performance may be providing much-needed assurance and new value-relevant information to market participants than other communication strategies. Collectively, these results indicate that, although the tone of earnings calls may primarily drive market reactions during normal times, a more complex phenomenon may be driving market reactions during crisis.

Table 8 Market reaction to earnings calls - Event study analysis. This table presents the cumulative average abnormal returns *CAAR* (T_1T_2) in basis points to the earnings calls held during the *COVID* period in panel A and for earning calls held during the *PRE-COVID* period in Panel B. *N* is the number of firms that are used to estimate *CAAR* across a range of event windows. The significance of *CAAR* is estimated using parametric tests.*, ** and *** denote significance at 10%, 5% and 1% level, respectively

Panel A: COVID

Event Windows	FULL SAMPLE		HARVEST		MODEST		CONSERVATIVE		IMPRESS	
	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)
[-20,+20]	262	236.07***	58	44.49	76	277.35**	55	226.06	73	352.86**
[-10,+10]	262	103.76*	58	79.26	76	34.21	55	50.30	73	235.90**
[-5,+5]	262	105.78**	58	146.81*	76	26.31	55	97.46	73	162.18*
[-3,+3]	262	114.93***	58	175.00**	76	0.83	55	118.96	73	182.95**
[-1,+1]	262	100.78***	58	83.75	76	41.89	55	144.76**	73	142.50*
[0,+1]	262	77.55**	58	66.58	76	32.40	55	98.64	73	117.36*
[0]	262	89.10***	58	97.84*	76	22.47	55	78.93	73	159.18***

Panel B: PRE-COVID

Event Windows	FULL SAMPLE		HARVEST		MODEST		CONSERVATIVE		IMPRESS	
	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)	N	CAAR (T_1T_2)
[-20,+20]	238	-39.53	54	186.43**	71	-407.92***	48	-239.95**	65	162.98
[-10,+10]	238	-83.13*	54	95.35	71	-445.83***	48	-243.11***	65	147.95
[-5,+5]	238	-18.29	54	128.51**	71	-264.65***	48	-174.43**	65	182.26**
[-3,+3]	238	-9.18	54	126.28**	71	-220.78***	48	-94.70*	65	159.13**
[-1,+1]	238	-19.39	54	128.04**	71	-267.72***	48	-110.12*	65	161.23**
[0,+1]	238	-21.02	54	115.14**	71	-252.47***	48	-88.03*	65	156.04**
[0]	238	12.94	54	158.01***	71	-188.73***	48	-76.39	65	175.33***

Overall, for the *COVID* period, the positive and significant market reaction indicates that, during times of uncertainty, the market welcomes communication that serves to reassure stakeholders. This positive effect observed over long event windows indicates that earnings call information tends to have a longer-lasting effect. This positive effect on *CAAR* for firms that adopt the *Impress* strategy indicates that an optimistic tone in conference calls during crisis periods, in spite of the lower level of past ESG, is welcomed by market participants. Markets are particularly positively surprised by firms that adopt the *Impress* strategy, which seems to provide additional value-enhancing information, corroborating the value-enhancing role of soft information in earnings calls especially during period of economic crisis.

5 Robustness Tests

5.1 Two stage least square model

We implement a series of robustness tests to ensure the reliability of our findings. First, we follow Awaysheh et al. (2020) and employ the instrumental variable model and 2SLS model to control for any endogeneity issue in our model specification (Eq. 1). Indeed, an endogeneity bias could occur while examining the relationship between ESG and tone due to the coexistence of sample selection bias, reverse causality, or unobserved heterogeneity. First, a sample selection bias could exist because firms that conducted earnings call during the first quarter following the COVID-19 pandemic may differ systematically from those that did not. Thus, the factors that affect firms' level of non-financial performance could also be correlated with the managerial tone in earnings calls, our dependent variable. Second, reverse causality occurs if ESG and tone affect each other. Third, unobserved heterogeneity arises when there is an omission of variables in the regression model.

A valid instrument for the endogenous variable (*ESG*) must meet two conditions: relevance and exclusion. The relevance condition requires a non-zero correlation between the endogenous variable and instruments. The exclusion restriction requires the instrument to be only indirectly related to the outcome variable (*Tone*) through its effect on the endogenous variable (Awaysheh et al. 2020). We use environmental innovation and workforce score as instruments for the endogenous variable (*ESG*) to address the potential endogeneity issue:

$$ESG = \alpha + \beta_1 ENV_INNOV + \beta_2 WORKFORCE + \sum_1^m \delta_m CONTROL_m + e \tag{4}$$

$$TONE_H = \alpha + \beta_3 \widehat{ESG} + \sum_1^m \delta_m CONTROL_m + e \tag{5}$$

The environmental innovation score (*ENV_INNOV*) reflects a company's capacity to reduce environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products. The workforce score (*WORKFORCE*) measures a company's effectiveness in terms of enabling job satisfaction, providing a healthy and safe workplace, maintaining diversity and equal opportunities, and offering development opportunities for its workforce. Both variables are sourced from the LSEG Workspace and normalised to percentages ranging from 0 to 100.

We consider our instruments valid for the following reasons. First, a company's capacity to reduce environmental costs and burdens for its customers (*ENV_INNOV*) and its effectiveness towards creating job satisfaction, healthy and safe workplaces, maintaining diversity, equality of opportunities, and development opportunities for its workforce (*WORKFORCE*) are essential for estimating ESG levels and are less likely to affect the level of tone. Moreover, our instruments affect the level of *ESG* but not the level of tone and are thus uncorrelated to the error term. We discuss the model's diagnostic tests because the results depend on the validity of our instruments. We first perform the Durbin-Wu Hausman test for endogeneity (Wooldridge 2010), which tests whether the instrumental variable method is required to estimate the causal relationship between *ESG* and *Tone*, instead of standard OLS model, to obtain unbiased and consistent estimates. The test statistics for the two-instrument model indicate that the instrumental variable model is preferred over OLS. The coefficients of the predicted residuals are significant for the models.

To confirm the appropriateness and validity of our instruments, we report the first-stage F-statistic (weak instrument test) and Hansen J-statistics of over-identification restrictions (which test the null hypothesis that our instrument variables are jointly exogenous). Small and nonsignificant Hansen J-statistics indicate that the instruments are valid and appropriate. For our models, the first-stage F-statistics are greater than Stock and Yogo's (2005) rule of thumb (a minimum critical value of 10), suggesting that there is no apparent weak instrument problem and supporting the validity of our instrument. In addition, the Wald test of exogeneity is significant in all cases, providing sufficient evidence to reject the null hypothesis of exogeneity. In our case, the significant Wald test of exogeneity suggests that *ESG* is not exogenous; hence, there is a need to address potential endogeneity issues via instrumental variable estimations (see Machokoto et al. 2021). Moreover, the Hansen J-statistic is small in both models (Panels A and B), suggesting that the null hypothesis is not rejected, and over-identification restrictions are valid. In summary, the models' diagnostic tests provide sufficient confidence that our instruments address potential endogeneity issues and significantly predict the exogenous variable ($TONE_H$). Hence, the validity of our instruments is confirmed, and the instrumental variable regressions are found to be robust estimations for our empirical analyses.

The results of the 2SLS model robustness test are reported in Table 9. In Panel A, we report the estimates across both the *COVID* and *PRE-COVID* periods; in Panel B, we report the estimates only for the *COVID* period. The results are consistent with our observations in Table 5.

5.2 Heckman two stage model

Another concern in previous result stems from self-selection bias. Firms do conference calls on a voluntary basis, therefore there are missing information on firms who did not conduct a conference call in the COVID period. To address the potential sample self-selection bias resulting from not being able to measure the relationship between tone and ESG for firms that did not release a conference call in the immediate aftermath of the COVID outbreak, we use Heckman's (1979) two-stage test. The results are reported in Table 10. We model the decision to conduct a conference call in the first stage. The dependent variable equals to one if the firm has conducted a conference call, and zero otherwise. Frankel et al. (1999) claims that conference calls are a form of voluntary disclosure mechanism and firms that conduct conference call tend to be larger, more profitable, have higher growth rates of asset and rela-

Table 9 Robustness − 2SLS model using instrument variables. This table reports the results of the robustness test using 2SLS regressions on the causal relationship between *ESG* and *Tone* using *ENV_INNOV* and *WORKFORCE* as instruments (Eq. 4 and Eq. 5) for the *COVID* and *PRE-COVID* period in Panel A and for the *COVID* period in Panel B. The robust standard errors are reported in brackets. Variables are described in Table 3. *, **, *** denote significance at 10%, 5%, and 1% levels, respectively

Variables	Panel A: COVID and PRE-COVID				Panel B: COVID			
	ESG	$TONE_H$	ESG	$TONE_{LM}$	ESG	$TONE_H$	ESG	$TONE_{LM}$
	1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage
ESG		-0.0035		-0.0285		-0.0042***		-0.0312*
		(0.0022)		(0.0181)		(0.0012)		(0.0174)
ROA	0.0118	-0.0001	0.0118	0.0162	0.1225	0.0023*	0.1225	0.0533
	(0.0773)	(0.0009)	(0.0773)	(0.0164)	(0.1752)	(0.0014)	(0.1752)	(0.0336)
LEV	-0.552	0.0054	-0.552	-0.1418	-0.1789	0.0112	-0.1789	-0.2321
	(0.432)	(0.008)	(0.432)	(0.1697)	(0.7211)	(0.0149)	(0.7211)	(0.1629)
LENGTH	-1.118	-0.0759***	-1.118	-0.3427	-2.4472	0.0072	-2.4472	0.5255
	(1.683)	(0.0236)	(1.683)	(0.5724)	(2.3452)	(0.0341)	(2.3452)	(0.6109)
MKT_CAP	4.1177***	0.0198	4.1177***	0.3376	3.1358***	0.0137	3.1358***	0.253
	(0.729)	(0.013)	(0.729)	(0.2058)	(0.9807)	(0.0166)	(0.9807)	(0.2547)
OPP	-44.9226**	0.2863	-44.9226**	-3.4724	-71.374**	-0.2677	-71.374**	-11.6657***
	(21.9821)	(0.2962)	(21.9821)	(4.315)	(28.2913)	(0.2289)	(28.2913)	(3.9735)
EPS_SURP	-0.0009	-0.0001	-0.0009	0.0027**	0.0107	-0.0001	0.0107	0.0032*
	(0.0062)	(0.0001)	(0.0062)	(0.0013)	(0.0089)	(0.0001)	(0.0089)	(0.0019)
ENV_INNOV	0.1944***		0.1944***		0.192***		0.192***	
	(0.0214)		(0.0214)		(0.0285)		(0.0285)	
WORKFORCE	0.4304***		0.4304***		0.4441***		0.4441***	
	(0.036)		(0.036)		(0.0484)		(0.0484)	
constant	-31.9728**	1.0693***	-31.9728**	-2.3416	-8.213	0.2612	-8.213	-11.1009*
	(15.6803)	(0.2516)	(15.6803)	(4.7494)	(20.8138)	(0.3303)	(20.8138)	(5.7529)
N	345	345	345	345	179	179	179	179
R square	59.80%	16.78%	59.80%	4.07%	59.38%	20.47%	59.38%	10.37%
F statistics	145.71***		145.71***		79.82***		79.82***	
Durbin Wu Hausman		4.98**		4.69**		8.87***		3.90*
Hansen J		0.49		0.67		0.41		0.42
Industry control	Y	Y	Y	Y	Y	Y	Y	Y

Table 10 Robustness - Heckman two stage model. This table reports the results of the robustness test using Heckman two stage methodology. The robust standard errors are reported in brackets. Variables are described in Table 3. *, **, *** denote significance at 10%, 5%, and 1% levels, respectively

Variables	1st Stage	2nd Stage							
	Choice of Con Call	$TONE_H$				$TONE_{LM}$			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	(8)	(9)
ESG		-0.0009				0.0046			
		(0.0008)				(0.0098)			
ESG X COVID		-0.0021***				-0.0177***			
		(0.0004)				(0.0042)			
ENV			-0.0006				0.0039		
			(0.0005)				(0.0071)		
ENV X COVID			-0.0021***				-0.0168***		
			(0.0003)				(0.0043)		
SOC				-0.0008				0.0023	
				(0.0008)				(0.0088)	
SOC X COVID				-0.002***				-0.0167***	
				(0.0004)				(0.004)	
GOV					0.001				0.0147*
					(0.0007)				(0.0078)
GOV X COVID					-0.0021***				-0.0186***
					(0.0004)				(0.0044)
ROA	0.0269*	0.001	0.001**	0.0009	0.0014	0.0301	0.0308	0.0291	0.0324
	(0.0151)	(0.0018)	(0.0005)	(0.0019)	(0.002)	(0.0214)	(0.0216)	(0.0213)	(0.0214)
LEV		0.0088	0.0092	0.01	0.0085	-0.1112	-0.1091	-0.1068	-0.1063
		(0.0115)	(0.0105)	(0.012)	(0.0125)	(0.1356)	(0.1374)	(0.1358)	(0.1363)
LENGTH		-0.0304	-0.0315	-0.0345	-0.0278	0.0684	0.0337	0.0481	0.0715
		(0.0348)	(0.0319)	(0.0366)	(0.0377)	(0.4113)	(0.4162)	(0.413)	(0.4113)
MKT_CAP	0.3948***	0.0252*	0.0262*	0.0289*	0.0117	0.3572	0.3742*	0.3844*	0.3157**
	(0.1286)	(0.0144)	(0.0143)	(0.0159)	(0.0106)	(0.2646)	(0.2153)	(0.2198)	(0.1574)
OPP		0.0799	0.0953	0.0856**	0.1676	-4.674	-4.6501	-4.6289	-4.2668
		(0.3455)	(0.3183)	(0.0422)	(0.3764)	(4.0873)	(4.1522)	(4.0863)	(4.1035)

Table 10 (continued)

Variables	1st Stage	2nd Stage							
	Choice of Con Call	$TONE_H$				$TONE_{LM}$			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	(8)	(9)
EPS_SURP	0.001**	-0.0001	-0.0001	-0.0001	-0.0001	0.0024*	0.0025*	0.0023**	0.0026*
	(0.0005)	(0.0002)	(0.0001)	(0.0002)	(0.0002)	(0.0014)	(0.0013)	(0.0012)	(0.0015)
ASSET_GR	-0.7455								
	(0.5386)								
PPE	-0.1006**								
	(0.0451)								
IMR		0.2438*	0.224*	0.2556*	0.2658*	2.884*	2.9223*	2.8841*	2.8979*
		(0.137)	(0.1216)	(0.1464)	(0.1445)	(1.706)	(1.6691)	(1.6286)	(1.539)
constant	0.1027	0.4282	0.3907	0.4	0.5048	-8.3099*	-8.3038*	-8.4174*	-8.2956*
	(2.102)	(0.419)	(0.385)	(0.44)	(0.4568)	(4.9564)	(5.0225)	(4.9641)	(4.9807)
Industry control	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	387	387	387	387	387	387	387	387	387
McFadden R^2	22.06%								

tively more intangible assets. Further conference calls are issued by managers when earning contains unusual and extra ordinary items and which belong to certain industry where the business environment is rapidly changing, suggesting industry specific drivers affecting the choice of conducting a conference call.

Following Frankel et al. (1999), we use size (*MKT_CAP*), profitability (*ROA*), growth rate of asset (*ASSET_GR*), tangible assets as a proportion of total assets (*PPE*), earning surprise (*EPS_SURP*) and industry (*2 digit SIC code dummy*) as independent variables. Variable are defined in Table 3. The estimation results are shown in Table 10.

We find firm's profitability, size, extent of earning surprise and proportion of tangible asset as strong predictors of the decision to conduct a conference call (from column 1, 1st stage regression). The parameters from this model are then used to compute the inverse mills ratio (*IMR*) for each variation of the models. In the second stage, we re-estimate Eq. (1), including the *IMR* to control for the nondisclosure of conference calls (column 2 to 5 using $TONE_H$ and column 6 to 9 using $TONE_{LM}$). The coefficient of *IMR* is statistically significant across all models at 10% level and justify the self-selection concerns as discussed earlier and the importance of taking the problem of endogeneity into account. Consistent with our results in Table 5, we find the coefficient of *ESG X COVID*, *ENV X COVID*, *SOC X COVID and GOV X COVID* is significantly negative across all variations of the models (using $TONE_H$ and $TONE_{LM}$). The second-stage regression results show that the coefficients and statistical significances of other independent variables remain qualitatively similar to those presented in Table 5.

5.3 Difference in Difference estimate

To address potential unobserved heterogeneity and strengthen causal inferences, we implement a difference-in-differences (DiD) analysis[6]. Firms with *ESG* scores above the median in the *PRE-COVID* period are designated as the treatment group, and those below the median as the control group. A dummy variable, *TREATMENT*, is defined as 1 for the treatment group and 0 for the control group. We estimate the following regression model:

$$TONE_H = \alpha + \beta_1 TREATMENT + \beta_2 COVID + \beta_3 TREATMENT * COVID + \sum_1^m \delta_m CONTROL_m + e \quad (6)$$

COVID is assigned a value of 1 for the COVID period and 0 for the PRE-COVID period, while *CONTROL* represents the standard vector of control variables as defined in Eq. (1). Table 11 reports the estimation results for Eq. (6). The coefficient for *TREATMENT X COVID*, capturing the differential effect of *COVID* on the treatment relative to the control group, is negative and significant. This indicates that firms with high *ESG* performance (treatment group) experience a sharper decline in the positivity of $TONE_H$ during *COVID* compared to those with low *ESG* performance. For additional robustness, we re-estimate the DiD model using pre-covid median scores of *ENV*, *SOC*, and *GOV* to define treatment groups (*TREATMENT-ENV*, *TREATMENT-SOC*, and *TREATMENT-GOV*) and reanalysed the models. The results, reported in Table 11 (Models 2, 3, and 4), are consistent, supporting the robustness of our findings. Collectively, the combination of 2SLS, Heckman two stage, and DiD techniques provides stronger evidence for the robustness of our results.

[6] We thank an anonymous reviewer for recommending the implementation of a variety of robustness tests, that have enhanced the reliability and robustness of our findings.

Table 11 Robustness - Difference-in-Difference estimate. This table reports the results of the robustness test using difference in difference methodology (Eq. 6). The robust standard errors are reported in brackets. *TREATMENT* is a dummy variable set to 1 if a firm's *ESG* score in the *PRE-COVID* period is above the sample median, and 0 if it is below the median, designating the control group. Variables are described in Table 3. *, **, *** denote significance at 10%, 5%, and 1% levels, respectively

Variables	$TONE_H$			
	(1)	(2)	(3)	(4)
TREATMENT	0.017			
	(0.0275)			
COVID	-0.0932***	-0.0758***	-0.0738***	-0.1059***
	(0.0259)	(0.0271)	(0.027)	(0.0262)
TREATMENT X COVID	-0.0664*			
	(0.0357)			
TREATMENT-ENV		0.03		
		(0.0277)		
TREATMENT-ENV X COVID		-0.0981***		
		(0.0354)		
TREATMENT-SOC			0.0525*	
			(0.0274)	
TREATMENT-SOC X COVID			-0.1022***	
			(0.0357)	
TREATMENT- GOV				0.0613**
				(0.0286)
TREATMENT-GOV X COVID				-0.0409*
				(0.0237)
Firm controls	Y	Y	Y	Y
Industry control	Y	Y	Y	Y
N	410	410	410	410
Adj. R square	89.75%	89.88%	89.87%	89.82%

6 Conclusion

This study provides new empirical evidence on the relationship between the tone of earnings calls, ESG performance, and market reactions during an economic crisis. We analyse earnings calls scheduled in the first wave of the COVID-19 pandemic and find them to be wordier, more negative in their tone, and less optimistic than calls before the pandemic. We identify four communication strategies based on the tone of the call and the level of ESG performance: *Harvest*, *Modest*, *Conservative*, and *Impress*. The negative relationship between ESG performance and tone confirms the adoption of the *Modest* and *Impress* communication strategies by firms during the COVID-19 pandemic, wherein firms with lower ESG project a more positive outlook in their earnings calls to reassure stakeholders. The event study analysis shows a positive and significant abnormal return following the calls, indicating that market participants need assurance and positivity, particularly during periods of crisis. Overall, the negative relationship between ESG performance and tone suggests the role of corporate communication in reassuring stakeholders in the presence of lower ESG performance, and the positive relationship between tone and market returns confirms the role of corporate communication in reassuring investors and market participants.

We contribute to the literature that deals with conference call disclosure tone, ESG performance and abnormal returns, specifically in the context of the COVID-19 pandemic. We provide the first evidence on the relationship between ESG performance and earnings call tone during crisis and add to the literature on the value relevance of non-financial information as a driver of managerial tone in earnings calls. Considering ESG performance as a measure of firm reputation, we contribute to the literature exploring the role of organisational reputation to serve as a buffer or a liability during crisis (Park and Rogan 2019; Pfarrer et al. 2010; Rhee and Haunschild 2006; Timothy Coombs and Holladay 2006). Our findings document a negative relationship between ESG performance and tone. In presence of higher reputation, i.e. high ESG performance, firms are subject to scrutiny from stakeholders and managers would use a more negative tone during crisis to maintain credibility; lower reputation firms would instead use a more positive tone to project a more positive outlook.

From a practical perspective, our results increase the understanding of the effectiveness of companies' communication strategies in reassuring stakeholders and market participants. This is particularly important during uncertain times, when corporate legitimacy is constantly under scrutiny and public-wide acceptance is more difficult to obtain. Understanding the relationship between ESG and tone, as well as how stock markets react to communication strategies, offer insights for companies to be better prepared to manage stakeholders' expectations when dealing with significant large-scale disruptions and making their own choices on ESG, tone, and communication, as well as investors when assessing corporate communication, and policymakers when formulating policies and initiatives related to ESG.

Our study provides a basis for further research in this area. Future studies could explore a different sample, beyond European firms; investigate other sources of disclosure tone beyond earnings calls, such as annual reports, websites, and social networks; and examine a broader time period accounting for more earnings calls conducted in the subsequent waves of the COVID-19 outbreak to enhance our collective knowledge of the global COVID-19 pandemic and its effects.

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Declarations

Conflict of interest The authors declare that they have no conflicts of interest.

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