ESG and firm resilience: A sprint or a marathon?

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A R T I C L E   I N F O

A B S T R A C T

Resilience is at the forefront in companies striving to build immunity against adverse shocks. Insurance through ESG is the focus of much research, yet it has thus far been dominated by a static and insufficient characterization of the diversity of ESG patterns across companies. We reconcile prior mixed evidence by embracing a longitudinally relative approach and by accounting for two aspects of a firm's ESG engagement: its degree of regularity over time (ESG coencnsistency), and the extent to which each firm reallocates its ESG engagement across pillars (ESG adaptability). We examine how these characteristics of ESG affect firm resilience, split into two dimensions: stability (the severity of economic loss), and flexibility (time to recovery). Using a sample of U.S. listed firms, our empirical context is the COVID-19 shock. Our evidence suggests that ESG consistency and ESG adaptability improve resilience stability, but that they have no significant impact on flexibility. We further find that such dynamic aspects of ESG become more important vis-à-vis strengthening the resilience of poorer ESG-engaged companies, for which signalling the sincerity of their ESG actions plays a crucial role in prompting stakeholder support. Overall, this evidence is consistent with the view that ESG engagement is a long-term commitment in terms of providing a pay-off for firms.

1. Introduction

In 2017, the Boston Consulting Group and the Fortune magazine gave birth to the Fortune Future 50, a forward-looking index spotlighting companies' "vitality".[1] In recent years, firm resilience has been upwardly valued due to greater awareness about exposure to a fast-moving and unpredictable environment (Nauck et al., 2021). Conventional risk management,[2] which assumes identifiable hazards, has suffered from a narrow focus. Consequently, there has been an upsurge of interest in exploring which corporate characteristics make firms more "immune" to adverse shocks (Van Der Vegt et al., 2015; DesJardine et al., 2019; Ding et al., 2021). We investigate resilience driven by a firm's ESG (environmental, social, and governance). We prompt a more granular understanding of the diversity of ESG patterns and the mechanisms which lead each of them to grant dissimilar resilience advantage.

Many studies have pointed to ESG engagement[3] as a powerful strategy to build firm resilience. However, they have failed to

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[1] For more information, visit the BCG official website: https://www.bcg.com/publications/2021/fortune-future-50-companies-show-growth

[2] Ortiz-De-Mandojana and Bansal (2016, p. 1619) acknowledge some differences between risk management and resilience. Risk management assumes that hazards are identifiable and aims to maintain the *status quo*. In contrast, resilience prepares firms for the unexpected and seeks adaptation to changes in the environment.

[3] Similar to recent works (Gillan et al., 2021; Fuente et al., 2022), we treat CSR and ESG as interchangeable, unified under the term ESG engagement to make it more aligned with its measurement through ESG scoring. ESG data summarizes extra-financial information to assess the quality of CSR.

sufficiently describe ESG dissimilarity across companies, and as such have portrayed a somewhat conflicting picture. Despite the plethora of evidence revealing that ESG-engaged firms have been more resilient to the financial crisis (Lins et al., 2017; Flammer and Ioannou, 2021; Sajko et al., 2021; Amiraslani et al., 2023) and the COVID-19 shock (Albuquerque et al., 2020; Cheema-Fox et al., 2021; Ding et al., 2021; Cardillo et al., 2023; Xu et al., 2023), recent works have evidenced divergences across countries (Abedifar et al., 2023; Yahya, 2023; Gianfrate et al., 2024). One plausible reason for such mixed evidence could be that analyses have largely ignored the fact that companies may deploy their ESG strategy differently, which may be reflected in something more than the score achieved. This partly obscures the mechanisms through which ESG might protect firms against adverse shocks, treats ESG practices of a similar score as equivalent and, as a result, could lead to the misconception that companies should simply be concerned about reaching a particular performance score. Altogether, this neglects the diversity of ESG patterns and downplays the multidimensional nature of ESG (Cuypers et al., 2016). Companies (even those with a similar ESG status) do not resist adverse shocks to the same degree. Des-Jardine et al. (2019) is one noteworthy study: they pioneer the categorization of ESG (either tactical or strategic, based on the time horizon) and uncover that each shapes firm resilience differently. They measure these types of ESG by matching each of them to a group of sub-dimensions and considering the latter's scores. However, we still do not know enough about the way in which each firm's allocation of its ESG efforts over time might impact a firm's resilience. This might prove critical, given that ESG is one strategy which mainly unfolds in the long-term.

Our study addresses this research void by shifting the focus from how much ESG-scoring a firm displays at a particular point in time (a static absolute measurement) to which temporal ESG pattern each firm implements over time (a longitudinally relative approach). In this way, we differ from recent studies such as Cardillo et al. (2023), Yahya (2023) or Xu et al. (2023), who appraise ESG scoring at a particular point in time. Furthermore, we expand current research such as Cheema-Fox et al. (2021), who use language processing to identify a firm's repurpose of operations upon external shocks, by proposing and testing novel quantitative measures to capture ESG pattern shifts over time. We complement and advance earlier longitudinal research on ESG based on event studies (Flammer and Kacperczyk, 2016; Qian et al., 2019). In so doing, we answer calls for further research on this strategy's temporality (Tang et al., 2012; Bansal et al., 2015; Uyar et al., 2022) and compare a firm's ESG with that of the company in its own track record. Given the long-term orientation of ESG, such a longitudinally relative viewpoint helps to elucidate the underlying mechanisms which shape firm resilience.

Specifically, we explore two dimensions of a firm's relative ESG over time: temporal ESG consistency –capturing the extent to which each firm engages in ESG in a systematic and regular manner over time (Tang et al., 2012), and ESG adaptability –the degree to which each firm reallocates its ESG engagement across pillars to align with its environment's most critical challenges. We ask: how do ESG consistency and adaptability uniquely contribute to firm resilience? To the best of our knowledge, no prior research has yet addressed the link between ESG and firm resilience using such a longitudinally relative and contingent perspective. We offer empirical evidence from the COVID-19 pandemic to exploit this recent shock as a natural experiment. While the last financial crisis was associated with excessive risk-taking, the coronavirus crisis displays two different interesting features (Albuquerque et al., 2020). First, its exogenous cause as a worldwide health emergency led to a close association between the evolution of COVID-19 cases and business activity recovery. Furthermore, many responses to the pandemic –such as health protection and work-life balance policies– urge companies to get under the ESG umbrella. The second feature stems from the sudden outbreak of the pandemic and its massive impact on sectors and companies (many of which are otherwise viable) due to mobility and social activity restrictions.

Based on a sample of U.S. publicly traded companies, we find that ESG consistency and ESG adaptability mitigate stock market losses, thus improving firm resilience stability. In contrast, such ESG dimensions have no significant effect on shortening the time to recovery from the shock (the flexibility dimension of resilience). This leaves room to identify other potential factors which may accelerate recovery. Our evidence reveals that these two relative measures of ESG become more important in firms with poorer ESG engagement, for whom conveying the sincerity of their ESG actions is more essential.

This paper makes several contributions. First, we add to the measurement of a firm's ESG strategy by proposing longitudinally relative measures to overcome static ESG scoring and so gain a better understanding of each firm's track record in ESG. This offers a more granular characterization of ESG and advances a multidimensional view in order to appraise its heterogeneity and be better positioned to determine its degree of sincerity (He and Harris, 2020; Fuente and Velasco, 2024). Second, we contribute to firm resilience literature. Our combining a longitudinal characterization of ESG strategy with a two-fold breakdown of resilience based on stability and flexibility is another noticeable and differentiating aspect of our work that sets it apart from prior research, which has mainly been concerned with firm performance measures and its volatility (e.g. Cheema-Fox et al., 2021; Yahya, 2023), whereas we delve into the underlying mechanisms of the insurance advantage of ESG. We promote a closer examination of how ESG shapes resilience at different levels. In addition, we reconcile puzzling evidence by improving our understanding of why ESG does not strengthen firm resilience universally, regardless of how sustainable practices are implemented. We complement prior research –primarily focused on the value impact of ESG– by shifting to another perspective that gains primacy during adverse times: value preservation. Identifying resilience-enhancing strategies –which may not necessarily be the most-value creating ones in all cases– proves crucial vis-à-vis protecting the interests of all stakeholders and reinforcing their attachment to the firm during adversity.

The outline of this article is as follows. Section 2 reviews the relevant literature. Section 3 sets out the hypotheses. Section 4 presents the sample and empirical methodology. This is followed by the explanation of the main findings in Section 5. Section 6 concludes and presents some limitations and future research avenues.

2. Literature review

Ortiz-De-Mandojana and Bansal (2016, p. 1615) define firm resilience as the "ability of organizations to anticipate, avoid, and adjust to shocks in their environment". It helps companies to adapt to the shifting business environment, to endure in the long term and

to survive crisis shocks (Van Der Vegt et al., 2015; Ortiz-De-Mandojana and Bansal, 2016; DesJardine et al., 2019). Studies provide a two-fold perspective of firm resilience by breaking it down into two dimensions (DesJardine et al., 2019; Sajko et al., 2021): stability (severity of loss) and flexibility (time to recovery). Stability refers to the maximum economic loss a firm suffers immediately following an adverse shock. Flexibility reflects the time to recovery; namely, the time it takes for a firm's stock price to reach its immediate pre-disturbance event level.

Among the strategic mechanisms that stimulate this "corporate immunity" (Ding et al., 2021), the literature emphasizes a firm's ESG. Ortiz-De-Mandojana and Bansal (2016) conclude that companies who undertake socially responsible and environmental practices exhibit lower financial volatility and better survival rates. Fuente et al. (2022) report supportive evidence that ESG engagement expands the pool of growth options for companies. Another stream of works has tested the insurance role of ESG in the most recent crisis shocks, such as the financial crisis (Lins et al., 2017; Flammer and Ioannou, 2021; Sajko et al., 2021; Amiraslani et al., 2023) and the COVID-19 lockdown (Albuquerque et al., 2020; Ding et al., 2021; Cardillo et al., 2023; Xu et al., 2023). Flammer and Ioannou (2021) support that maintaining investment in ESG and innovation helps firms to sustain their competitiveness during downturns. Other works find that the insurance benefits of ESG also occur against endogenous adverse events, such as managerial bad news hoarding (Dumitrescu and Zakriya, 2021).

In contrast, another group of recent studies (Abedifar et al., 2023; Yahya, 2023; Gianfrate et al., 2024) has cast doubt on this evidence, suggesting that it is not generalizable across all institutional contexts.[4] For example, Abedifar et al. (2023) confirm that ESG improved resilience in U.S. companies in the COVID-19 downturn but failed to do so in Japanese and UK firms. Based on the Nordic setting, Yahya (2023) conducts a difference-in-difference analysis and shows that the positive effect of ESG on firm performance is stronger in lockdown countries (Denmark, Finland, Iceland, and Norway) than in non-lockdown ones (Sweden). Altogether, this conflicting evidence reveals the need for further research about the mechanisms which can drive dissimilarities in the ESG-resilience association. We isolate institutional-based factors by undertaking a single-country analysis and focuses on the underlying mechanisms connected to diverse patterns of ESG within companies.

Extensive research supports that the primary force which endows ESG with its insurance benefits lies in the accrual of moral capital and trust across a firm's stakeholders, which pay off during negative shocks such as market crises (Lins et al., 2017; Flammer and Ioannou, 2021; Amiraslani et al., 2023), industry-specific shocks (Godfrey et al., 2009; Shiu and Yang, 2017), and firm-specific problems (Godfrey, 2005; Dumitrescu and Zakriya, 2021). Consistent with this idea, existing evidence suggests that companies are likely to increase their ESG disclosure following adverse events (Huang et al., 2022). Amiraslani et al. (2023) reveal that more ESG-engaged companies were regarded as more trustworthy by their bondholders during the financial crisis, and such companies were able to borrow more debt, at lower spreads and for longer maturities.

The manner in which each firm manages its ESG engagement over time is by no means a trivial issue, since the insurance benefits of ESG depend to a large degree on social reputation and stakeholder trust-building (Cuypers et al., 2016; Lins et al., 2017; Uyar et al., 2022; Amiraslani et al., 2023). This in turn calls for a multidimensional analysis of ESG –to which this study aims to contribute– in order to appraise the heterogeneity in how companies engage in this strategy (Cuypers et al., 2016; Uyar et al., 2022). The more genuine and authentic a firm's ESG strategy, the stronger and longer-lasting the bonds it forges between firm and stakeholders (He and Harris, 2020). The literature emphasizes that ESG credibility is essential if this strategy is to work (McShane and Cunningham, 2012; Albuquerque et al., 2020; Fuente and Velasco, 2024).

Overall, good stakeholder relationships are cornerstone to firm resilience (Albuquerque et al., 2020; Liu and Yin, 2020; Sajko et al., 2021). DesJardine et al. (2019) earlier contributed to appraise ESG diversity and how it affects firm resilience. They classify ESG practices into tactical (those that are short-term oriented, more quickly executed and easily reversible), and strategic (that are long-term oriented and require substantial mobilization of firm resources). They articulate their measurement by matching each of them to particular subdomains of ESG. Tactical practices are those concerned mainly with the community, whereas strategic practices comprise broader domains such as environment, employee relations, and human rights, to name but a few examples. Fuente and Velasco (2024) focus on the construct of ESG disparity and propose a measure based on the degree of inequality in the distribution of a firm's overall ESG at a particular a point in time. However, these earlier works still fail to incorporate a longitudinally relative measurement of a firm's ESG track record that might bring additional nuances to capture ESG diversity vis-à-vis how firms deploy them over time.

Consequently, incorporating this issue of a firm's resilience is one distinctive feature of our study. Building on the stakeholder and signalling theories, which have been extensively used in ESG research (Fu et al., 2021; Fuente and Velasco, 2024), we hypothesize and track two characteristics of how a firm's ESG evolves over time, and we explain how these might serve as powerful signalling mechanisms to stakeholders about the underlying unobservable attributes of ESG practices. As a result, such two dimensions of ESG might shape this strategy on firm resilience: first, temporal ESG consistency, which might signal how genuine a firm's ESG engagement is perceived to be by stakeholders and, therein, strengthen firm resilience; second, ESG adaptability, which might improve firm resilience by enhancing a firm's ability to reallocate its ESG efforts so as to accommodate them to the shifting critical issues of the firm's environment. Through such dynamic lenses, we answer research calls for a more in-depth exploration of the temporal orientation of a firm's commitment to ESG (Bansal et al., 2015). See Fig. 1 for an outline of our explored dimensions of ESG strategy and firm resilience.

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[4] See Gianfrate et al. (2024) for an analysis of the effect of ESG on resilience across different asset categories: stocks, credit default swaps, and corporate bonds.

3. Hypotheses

3.1. Temporal ESG consistency and firm resilience

The COVID-19 pandemic moved ESG[5] into the spotlight, and placed its genuineness under greater scrutiny (He and Harris, 2020; Fuente and Velasco, 2024). Uyar et al. (2022) document that ESG inconsistency over time reduces the likelihood of good ESG performing firms being given an ESG award. Indirectly, this finding relates stronger temporal ESG consistency to this strategy's credibility. In view of this, we conceptualize temporal ESG consistency as the extent to which a firm is involved in ESG engagement in a systematic and regular manner over time (Tang et al., 2012). Wang and Choi (2013) find that temporal consistency improves the impact of ESG actions on a firm's financial performance, yet they do not explore whether such temporal consistency may contribute to firm value preservation against adversity.

Our study advances on this front and proposes that stronger temporal ESG consistency might enhance the two dimensions of firm resilience. This might be due to two related mechanisms: richer accrual of moral capital within the firm and, as a consequence, stronger stakeholder[6] reciprocity and greater willingness to help the company in adverse times (Lins et al., 2017). We theorize the underlying mechanisms which lead to our hypotheses by combining the stakeholder and signalling theories. Signalling theory underscores the usefulness of a firm's signals to convey to stakeholders (Zhang et al., 2022; Connelly et al., 2024). The dimensions of ESG (ESG consistency and ESG adaptability) are likely to serve as powerful signalling vehicles to convey the positive quality of the underlying unobservable attributes of ESG practices to stakeholders. In this way, signalling theory helps to explain why these dynamic ESG dimensions have stakeholder-based usefulness in that they provide stakeholders with timely informative signals about the genuineness of a firm's ESG strategy.

On the one hand, with regard to the stability dimension –and according to the lenses of the stakeholder theory (Chau et al., 2025)– stronger temporal ESG consistency provides a positive signal for outsiders that enhances firm legitimacy and which is therefore likely to favour more highly perceived sincerity of such ESG efforts by stakeholders. This can in turn propel the accrual of moral capital and curb potential losses when adverse shocks occur. Godfrey et al. (2009) and Koh et al. (2014) note that the usefulness of such moral capital has more to do with value preservation than with value creation insofar as it stimulates positive attributions from stakeholders and their undertaking of extra-role behaviours in support of the firm (De Roeck et al., 2024). Koh et al. (2014) argue that favourable stakeholder appraisal is greater once the firm offers them the hope of a viable future, which might be promoted by ESG consistency. Shiu and Yang (2017) obtain evidence that ESG has insurance benefits on both the stock and bond prices of firms during negative events, with this risk-mitigating effect being stronger in companies that display longer-term ESG engagement, due to the higher moral capital accrued. Similarly, Barnett (2007) contends that stakeholder response to ESG is more favourable if firms possess a longer history of ESG actions, which enhances their perceived credibility. Overall, the perceived sincerity that ESG consistency reinforces is expected to foster moral capital from ESG (Wang and Choi, 2013) and stands the firm up as being substantially trustworthy, which stimulates reciprocal stakeholder support towards the firm, especially when a negative disruptive event occurs (Koh et al., 2014; Lins et al., 2017). Therefore, we expect this to help mitigate market losses and to enhance resilience stability.

On the other hand, looking at the flexibility dimension of resilience, a more favourable appraisal of ESG genuineness due to the positive signal of stronger temporal consistency is likely to increase stakeholder willingness to cooperate in adaptations within the firm (Fombrun et al., 2000; Lins et al., 2017; De Roeck et al., 2024). Consequently, we expect this to boost resilience flexibility. When adverse shocks occur, it is helpful to rely on flexible resources within the firm that can be redeployed to a wider scope of alternatives (Ortiz-De-Mandojana & Bansal, 2016). As a result, this might help the firm to recover from adversity. For example, such flexible resources could consist of human resources: a firm's ESG can endow it with richer moral capital which sensitizes stakeholders and puts them on the firm's side to adapt to changing circumstances (Fombrun et al., 2000; Koh et al., 2014). Another illustrative example of the flexibility fostered by ESG may appear in the form of financial resource flexibility. Zhang et al. (2020) report evidence that firms with better ESG scoring are more likely to receive trade credit from their suppliers. Firms who consistently embrace ESG over time are likely to reinforce their stakeholder influence capacity, which promotes more dynamic stakeholder relationships (Barnett, 2007; Barnett and Salomon, 2012). This might endow such relationships with greater flexibility to change over time. Based on the previous arguments, we expect stronger temporal ESG consistency to increase stakeholder willingness to embrace and become involved in adaptations within the firm to prompt its recovery.

Summing up our discussion, we hypothesize:

Hypothesis 1. A firm's stronger temporal ESG consistency improves firm resilience (its stability and flexibility dimensions).

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[5] Our hypotheses arguments refer to ESG practices as a whole. The study of individual pillars of ESG lies beyond our scope because of the diverse nature between them and within them. Each pillar displays a dissimilar ability to stimulate sincerity in the eyes of stakeholders, thus sparking value preservation mechanisms differently (Godfrey et al., 2009; Cuypers et al., 2016). This is a promising avenue for further research.

[6] Our study is at the firm-level, not at the stakeholder-level. In our hypotheses development, we therefore refer to the bulk of stakeholders as a whole. One valuable future research line could be to develop further models of stakeholder identification (as urged by recent calls such as Crane and Matten (2021) and Fuente et al. (2025)) in order to provide a finer-grained understanding of how each stakeholder group might contribute to firm resilience to a different degree. We thank an anonymous reviewer for this insight.

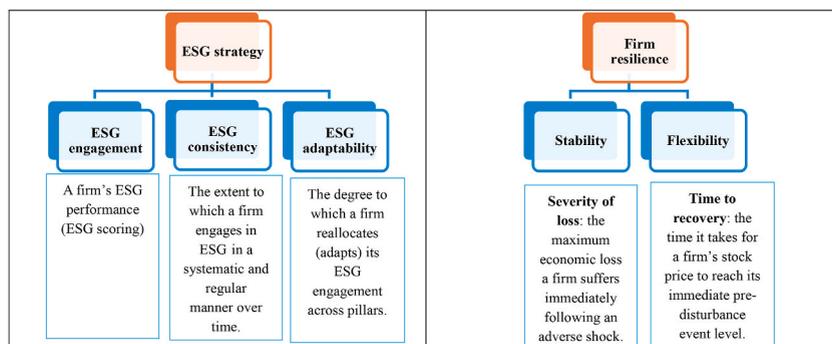**Sub-dimensions of ESG strategy and firm resilience: An outline**

Fig. 1. Sub-dimensions of ESG strategy and firm resilience: An outline.

3.2. ESG adaptability and firm resilience

Another key source of resilience lies in a firm's ability to quickly process and respond to changes within its environment (Ortiz-De-Mandojana & Bansal, 2016; Cheema-Fox et al., 2021). We posit that ESG's effectiveness in curbing economic losses (firm resilience stability) against adverse shocks is likely to depend on how well each firm is able to reallocate its ESG efforts across pillars based on the changeable critical matters in its stakeholder environment. From the stakeholder (Barnett, 2007; Barnett and Salomon, 2012; Chau et al., 2025) and signalling approaches (Zhang et al., 2022; Connelly et al., 2024), such ESG adaptability may provide a positive signal of ESG genuineness to stakeholders and so drive stakeholder perception of ESG actions as being more credible, thereby strengthening stakeholder influence.

Such an adaptation of ESG actions to better meet changeable challenges might help differentiate the firm to a greater extent in uncertain times (Albuquerque et al., 2019), thereby contributing to firm value preservation (Cheema-Fox et al., 2021; Doukas and Zhang, 2024). Prior studies such as Hartzmark and Sussman (2019) confirm that companies' ESG strategies draw much attention in capital markets and are viewed as a positive attribute by stakeholders. Cheema-Fox et al. (2021) draw on measures of media sentiment from language processing of news coverage during the COVID crisis and document lower negative returns in companies which announced policies to strengthen the social pillar. Some examples are the improvement of their employee and supply chain relationships (e.g. flexible work), or business repurpose to temporarily shift a part of their operations to urgently demanded products such as the production of facemasks. In short, firms who make a major effort to achieve a better and more timely alignment of their ESG practices in keeping with the most critical issues will be more likely to gain stronger moral legitimacy (Koh et al., 2014). Being seen as trustworthy becomes more valuable in a crisis that is plagued by environmental uncertainty. Stakeholders are therefore likely to lend greater support to firms that adopt more timely ESG strategies, since these endow firms with greater perceived legitimacy in the eyes of stakeholders (McShane and Cunningham, 2012; Koh et al., 2014; Lins et al., 2017). This then creates an insurance shield, and such firms are likely to display stronger resilience in terms of stability.

As for the flexibility dimension of resilience, ESG adaptability facilitates congruence between socially responsible activities and the critical matters of a firm's stakeholder environment as a whole (Bae et al., 2021), which may be a favourable signal to elicit further efforts from stakeholders to save the company in the face of adversity. For instance, employees may become more productive if their companies commit themselves to flexible work schedules, reduce layoffs, curb employee turnover rates, or improve conditions for sick leaves (Cheema-Fox et al., 2021). Along with this argument, Magrizos et al. (2021) document that ESG becomes more valuable when managers prioritize high-priority stakeholder issues. A firm's reallocation of its ESG efforts to align them to the changeable needs that emerge from the environment might signal a non-self-serving orientation (Godfrey et al., 2009), which is found to spark stakeholder trust and friendly responses during crisis periods (Fombrun et al., 2000; Lins et al., 2017). Overall, we expect this greater ESG adaptability to ensure that the firm satisfies its stakeholders' critical issues successfully in response to the most pressing circumstances at each point in time, thereby encouraging stakeholders to support a firm's recovery upon an adverse shock.

Therefore, we hypothesize:

Hypothesis 2. A firm's greater ESG adaptability strengthens firm resilience (its stability and flexibility dimensions).

4. Empirical methodology

4.1. Data and sample

Our starting point reproduces recent works on the COVID-19 shock (Albuquerque et al., 2020; Fahlenbrach et al., 2021) by considering all publicly traded U.S. companies with available financial data at the end of the 2019 fiscal year. We gather data on U.S. firms from the London Stock Exchange Group (LSEG) platform (previously, Refinitiv Eikon), which is our main source of data. We retrieve 2019 fiscal year-end data for balance sheet, income statement and segment data variables from Worldscope. We obtain daily

closing stock market prices from Thomson Datastream for the period January 2020 to March 2022. We collect yearly ESG scores and corporate governance variables for the period 2011-2019 from LSEG. This is a first-tier provider of ESG data for extensive coverage of listed companies and offers industry-adjusted scores as well as a cross-national perspective of ESG (Kölbel and Busch, 2021). LSEG's ESG scoring also draws on a large number of metrics that compile information from a wide array of sources such as corporate annual reports, sustainability reports, and stock exchange filings (Albuquerque et al., 2020; Amiraslani et al., 2023). This overcomes potential biases from self-reported information (Amiraslani et al., 2023). Its methodology is mainly driven by the needs of investors,[7] and its ratings are objective and comparable (Kölbel and Busch, 2021).

Consistent with earlier research (Fahlenbrach et al., 2021), we implement the following sample selection filters based on 2019 data. First, we eliminate financial firms (SIC 6000-6999), utility firms (SIC 4900-4949), and not-for-profit and governmental firms (SIC 8000s and 9000s). We drop firms with non-US headquarters and those whose stock market price on December 31, 2019 was less than one USD dollar. Given our research focus, we only consider firms with ESG score coverage in LSEG in 2019. Additionally, firms displaying negative common equity (93 firms) are removed so as to minimize confound effects. Finally, we require firms to report no missing financial data at fiscal year 2019 for our relevant control variables. After these filters, our final sample includes 1292 firm-year observations (companies). Table 1 details the application of these selection filters to reach the final sample.[8] A few additional observations were dropped in some regressions as a result of the longitudinally relative nature of the proxies for ESG consistency and ESG adaptability, which require availability of ESG data for a longer time window. Our control variables –which exhibit a wider variation range– are winsorized at the 1% level in each tail.[9]

The World Health Organization (WHO) officially announced the outbreak of a Public Health Emergency of International Concern on 30 January 2020. After that, this shock's impact on financial markets was particularly noticeable. We consider such a date as the event date of the COVID-19 shock. To further check the robustness of our results, we use the WHO declaration of the coronavirus outbreak as a global pandemic on March 11, 2020 as an alternative event date (Harjoto et al., 2021).

4.2. Description of variables

Table A.1. of the Appendix describes the variables and their data sources.

4.2.1. Dependent variable: Firm resilience

Most prior studies measure firm resilience based on two dimensions (DesJardine et al., 2019; Sajko et al., 2021): stability and flexibility.

Stability dimension of firm resilience –this accounts for the severity of loss in market value after the corresponding market crash (DesJardine et al., 2019; Sajko et al., 2021). We calculate this as the change in each firm's stock price between the pre-shock closing price (on 30 January 2020) and the lowest stock price observed in the 12-month horizon, divided by the pre-shock closing price (*Severity of shock (*12-month*)*). Following DesJardine et al. (2019), we bound this time window to one year in order to avoid including noise from variations in stock prices due to other events. We conduct robustness analyses by considering alternative horizons to compute this measure −18 months and 24 months (*Severity of shock (*18-month*)* and *Severity of shock (*24-month*)*, respectively). These alternative measures are direct proxies for the stability dimension of firm resilience: the higher they are (as represented by more positive or less negative values, which imply a less severe loss of stock market value), the more resilient a firm is in terms of the stability dimension.

Flexibility dimension of firm resilience –this captures the amount of time needed to recover from the COVID-19 shock (DesJardine et al., 2019; Sajko et al., 2021). We measure it (*Time to recovery*) as the natural logarithm of the number of days it takes for a firm's stock price to recover its pre-shock closing price as of 30 January 2020. This is an inverse proxy for the flexibility dimension of firm resilience: the lower the *Time to recovery*, the sooner the firm recovers from the shock and the more resilient it is.

4.2.2. Independent variables

A firm's ESG engagement –our aforementioned measures for ESG consistency and ESG flexibility are based on a firm's ESG engagement. We approximate this latter by the average of the three pillar scores (environmental, social, and governance)[10]. These scores are 100-point-based and we convert them to a 10-point-based scale to alleviate heteroscedasticity (Cheng et al., 2014; Fuente et al., 2022, 2025). As a result, our measure ranges between 0 (the lowest ESG rating) and 10 (the highest ESG rating). In some regressions, we control for *ESGengagement* as the level of ESG in 2019. In robustness analyses, we account for a firm's sustainability scores across individual pillars: *ENV, SOC* and *GOV*, which are the scores in the environmental, social, and governance pillars, respectively.

A firm's temporal ESG consistency –ESG consistency over time refers to how regular a firm's ESG engagement is over time (Tang et al., 2012; Wang and Choi, 2013). Following earlier studies (Keats and Hitt, 1988; Simerly and Li, 2000; Wang and Choi, 2013), for

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[7] This benefit is particularly important for our research, given our market-based perspective of resilience.

[8] We thank an anonymous reviewer for this remark.

[9] Some robustness analyses are performed by applying alternative cutoffs for winsorization (at the 0.5% and 5% levels) as well as by estimating without winsorization. Results are robust and are available upon request.

[10] In robustness analyses, we use the ESG score reported by LSEG, which is data-driven based on over 630 company-level ESG measures which are grouped into ten categories in order to compute the three pillar scores and pillar weights (which vary across industries) to reach the final ESG scores (Refinitiv, 2022).

Table 1
Sample selection filters.

Selection filters	Firm-year observations
Publicly-traded U.S. companies at the end of 2019 fiscal year	12,466
less: firm-year observations from the finance, insurance and real estate sectors (SIC code range 6000-6999)	−2,235
less: firm-year observations corresponding to utility firms (SIC code range 4000-4999)	−160
less: firm-year observations corresponding to not-for-profit and governmental firms (SIC code range 8000-9999)	−894
less: firm-year observations with non-US headquarters	−282
less: firm-year observations with stock market price less than 1$ on December 31, 2019	−2,813
less: firm-year observations with no ESG data coverage	−4,523
less: firm-year observations with zero or negative common equity	−93
less: firm-year observations with missing data in our relevant control variables	−174
Final sample	**1,292**

each firm, we regress its ESG scores during the latest years against time (the variable indicating the year of the observation) in order to estimate regression coefficients (the slopes) and their standard errors. To do so, we draw on *ESGengagement* over the 2011-2019 period[11] and require each firm to have at least three firm-year observations with non-missing data to be able to compute its corresponding regression. This yields a standard error for each firm (associated with the coefficient of year) and we change its sign to obtain a direct measure for ESG consistency (*ESGconsistency*). Consequently, the greater the *ESGconsistency* (which corresponds to a lower standard error associated with the coefficient year in the previous regressions) the higher the temporal ESG consistency a firm will display.[12]

A firm's ESG adaptability –this refers to a firm's ability to reallocate its ESG efforts across the three pillars to align its strategy to the particular critical issues of each shock. We draw on Venkatraman's (1989) notion of fit as profile deviation: we measure how much a firm's ESG profile across pillars after the COVID-19 shock deviates from a reference profile, defined as the firm's ESG engagement before the shock. We rely on the Euclidean distance (Andrés et al., 2017) to calculate the deviation of the post-shock ESG engagement from its corresponding pre-shock one. In order to avoid misleading results and so be able to determine whether a firm's ESG engagement has improved or not after the COVID-19 shock, we change the sign of the latter Euclidean measure to negative if a firm's *ESGengagement* in 2020 is lower than *ESGengagement* before the shock. This measure is expressed as:

$$ESGadaptability = \sqrt{\left(E_{2020} - E_{preshock}\right)^2 + \left(S_{2020} - S_{preshock}\right)^2 + \left(G_{2020} - G_{preshock}\right)^2} \text{ if } ESGengagement_{2020} > ESGengagement_{preshock}$$
[1]

$$ESGadaptability = -\sqrt{\left(E_{2020} - E_{preshock}\right)^2 + \left(S_{2020} - S_{preshock}\right)^2 + \left(G_{2020} - G_{preshock}\right)^2} \text{ if } ESGengagement_{2020} < ESGengagement_{preshock}$$
[2]

where E_{2020}, S_{2020} and G_{2020} indicate a firm's score in the environmental, social, and governance pillars, respectively, in fiscal year 2020 after the COVID-19 shock. $E_{preshock}$, $S_{preshock}$ and $G_{preshock}$ denote a firm's score in the environmental, social, and governance pillars, respectively, before the COVID-19 shock. For robustness, we alternatively take two lags and one lag of pillar scores as the reference of pre-shock scoring (namely, the scores reported in 2018 and 2019). Accordingly, we calculate *ESGadaptability2y* and *ESGadaptability1y*, which are based on pre-shock scores of 2018 and 2019, respectively.

Moreover, we compute an alternative measure for ESG adaptability that accounts for the specific nature of the COVID-19 crisis. This exogenous shock stems from public health concerns, and with the social pillar gaining major importance (e.g. a healthy and safe workplace, protection of public health).[13] Accordingly, we capture ESG adaptability in terms of a firm's ability to reallocate its ESG efforts across pillars in order to foster its actions in the social pillar. We account for what portion of *ESGadaptability* comes from the social pillar by computing the ratio of deviation in the social pillar scores divided by the total Euclidean distance:

$$SOCadaptability = \frac{\sqrt{\left(S_{2020} - S_{preshock}\right)^2}}{\sqrt{\left(E_{2020} - E_{preshock}\right)^2 + \left(S_{2020} - S_{preshock}\right)^2 + \left(G_{2020} - G_{preshock}\right)^2}} \text{ if } ESGengagement_{2020} > ESGengagement_{preshock}$$
[3]

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[11] We do not take into account 2020 in order to avoid noise in capturing a firm's regularity in its ESG track record over time. Including the year in which the crisis shock occurs is very likely to spark confounding effects.

[12] Other studies such as Uyar et al. (2022) measure ESG consistency based on the standard deviation of *ESGengagement* during a period of time. However, we decline to apply this measure because the standard deviation draws on the sample mean which is a poor statistic with limited ability to capture temporal trends (Sorensen, 2002; Wang and Choi, 2013). Firms that improve their ESG over time may wrongly appear as displaying inconsistent ESG behaviour. In any case, we conduct additional checks by computing ESG consistency as minus the standard deviation of a firm's ESG scores from 2011 to 2019 (*ESGstd_dev*). Results are similar and available upon request.

[13] Conversely, in the case of the energy crisis in 2022, the environmental pillar plays a major role.

$$SOCadaptability = -\frac{\sqrt{\left(S_{2020} - S_{preshock}\right)^2}}{\sqrt{\left(E_{2020} - E_{preshock}\right)^2 + \left(S_{2020} - S_{preshock}\right)^2 + \left(G_{2020} - G_{preshock}\right)^2}} \text{ if } ESGengagement_{2020} < ESGengagement_{preshock}$$

[4]

Similar to the previous measures, we alternatively calculate *SOCadaptability2y* and *SOCadaptability1y*, which are based on pre-shock 2018 and 2019 scores, respectively.

4.2.3. Control variables

In our cross-sectional regressions, we control for a number of firm-level and industry-level factors that are likely to influence firm resilience (DesJardine et al., 2019; Sajko et al., 2021): firm size (*SIZE*), measured by one plus the natural logarithm of the book value of total assets; firm age (*AGE*), proxied by one plus the natural logarithm of the number of years from 2019 since the firm was first covered by LSEG; firm intangible assets (*INTANGIBLE*), calculated as the ratio of intangible assets to the book value of total assets; firm operational efficiency (*OPEFFICIENCY*), captured through assets turnover; firm profitability (*PROFITABILITY*), measured by earnings before interest and taxes divided by the book value of assets; firm leverage (*LEVERAGE*), measured by the ratio of total debt to the book value of assets; firm capital intensity (*CAPITALINT*), proxied by the ratio of capital expenditures to the book value of assets. All control variables are obtained using their pre-shock levels, namely 2019 fiscal year-end data (Ding et al., 2021; Fahlenbrach et al., 2021). Moreover, we control for the business diversification status since this strategy has been found to provide firms with flexibility advantages in crisis shocks (Kuppuswamy and Villalonga, 2016): *dumDIVER* equals one if the firm reports two or more segments in different 4-digit SIC code industries, and zero otherwise.

Additionally, we control for corporate governance characteristics[14](Croci et al., 2024): board size (*BOARDSIZE*), measured by the natural logarithm of the total number of directors in the board; board independence (*BOARDINDEP*), proxied by the ratio of independent directors to total board directors; board diversity (*BOARDDIV*), proxied by the ratio of female directors to total board directors; the presence of CEO duality (*dumCEOduality*), approximated by a binary variable equal to one if a firm's CEO also chairs the board, and zero otherwise. Strategic ownership (*STROWNERSHIP*), as the proportion of shares held by strategic investors (Abdi and Mohammadi, 2025), is also reported by LSEG and is entered in our models. Investor types considered to be strategic are the following: holding companies, individuals, government agencies, and private equity firms. Finally, we add a set of industry dummies to control for industry-fixed effects. rely on the industry scheme by the U.S. Department of Labor, which categorizes the 2-digit SIC codes into ten major divisions (Fuente et al., 2022).

4.3. Descriptive statistics

Table S2 provides the descriptive statistics.[15] As regards the stability dimension of firm resilience, the mean values of the different proxies (*Severity of shock (*12-month*)*, *Severity of shock (*18-month*)* and *Severity of shock (*24-month*)*) are about −0.48, which indicates an average loss of about 48% of the stock price between pre-shock trading day and the day with the lowest stock price within the subsequent time window up to 24 months. *Time to recovery* ranges between 0 and 6.208, implying that it takes our sample firms about 497 days –at most– to recover their pre-shock stock price. On average, firms exhibit a low-medium level of ESG engagement (about 3.89 out of 10). As for the pairwise correlations, *ESGengagement* is positively correlated with *ESGconsistency* (statistically significant at the 1% level), whereas it is negatively correlated with proxies for ESG adaptability over a one-year time horizon (*ESGadaptability1y* and *SOCadaptability1y*). As for the two dynamic dimensions of a firm's ESG, it is also worth noting that only *ESGconsistency* is significantly correlated with the *Severity of shock* proxies. ESG adaptability only exhibits statistically significant correlations for the social pillar (*SOCadaptability2y*), which could be attributed to the particular nature of the COVID-19 shock.

We next compare ESG across industries. Table A.2. of the Appendix shows the median levels and statistical dispersion (interquartile range) of ESG engagement, ESG consistency, and ESG adaptability. The greatest median levels of ESG engagement (about 3.67-3.73) occur in the retail trade, manufacturing and wholesale trade industries. The poorest ESG-engaged industry is the division of agriculture, forestry and fishing (1.74), which also exhibits the lowest dispersion in the middle 50% of observations. Poorer ESG-engaged industries follow a more consistent ESG strategy over time, as confirmed by higher median levels of *ESGconsistency*. As regards ESG adaptability, results reveal that agriculture, forestry and fishing undergo the most salient change in pillar reallocation of their ESG after the COVID-19 shock.

4.4. -ESG engagement, ESG consistency, and ESG adaptability: a general perspective of the association between the constructs

We graphically depict the average levels of ESG consistency and ESG adaptability by quartiles of ESG engagement. Figure A.1. of the Appendix. The 25th top quartile of ESG-engaged firms exhibits the most consistent ESG. This agrees with the idea that ESG is a long-term strategy that requires consistency over time in order to be a signal which gains credibility from stakeholders and to accrue its intangible benefits from moral capital and other intangible assets. Similarly, Figure A.2. Shows there are no meaningful differences in

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[14] We acknowledge an anonymous reviewer for this suggestion.

[15] For variables in log format, descriptive statistics of their unlogged version are available upon request. For our dependent variable, it is worth noting that time to recovery in days (unlogged) ranges from 1 to 497 days, with a mean value of 25.97 days, respectively.

the mean values of *SOCadaptability2y* across quartiles of ESG engagement. Finally, Figure A.3. Plots a negative (yet weak) association between ESG consistency and ESG adaptability. This goes along with the non-statistically significant correlations between these two constructs.

To further understand the difference between the previous constructs, Table A.3. of the Appendix performs a set of mean-comparison t-tests. On average, ESG consistency is higher in firms with above median ESG engagement (−0.1176) than in their below median counterparts (−0.1299). Above-median ESG-engaged firms also exhibit greater ESG adaptability on average. This may explain why, although ESG consistency and ESG adaptability display a weakly negative correlation, the sign of the impact of both constructs on firm resilience might still be in the same direction. Panel B suggests that above-median ESG consistency firms have superior ESG engagement and weaker ESG adaptability, in average terms. This same latter result is supported by evidence from Panel C.

4.5. Estimation methodology

Similar to recent research on the COVID-19 shock (Fahlenbrach et al., 2021), we rely on cross-sectional regressions with ordinary least squares (OLS) to assess the relationship between a firm's ESG strategy and corporate resilience. Control variables are entered at their 2019-year levels. The variables of the pattern of ESG engagement (ESG consistency and ESG adaptability) and the variables of a firm's resilience (the stability and flexibility dimensions) are computed on a time series data, resulting in one single observation per firm. We estimate the following regression model:

$$RESILIENCE_k = \gamma_0 + \gamma_1 \cdot ESGengagement_{k,2019} + \gamma_2 \cdot ESGconsistency_k + \gamma_3 \cdot ESGadaptability_k + \gamma_4 \cdot Controls_{k,2019} + INDUSTRY_j + \varepsilon_k$$

$$[5]$$

where k denotes each firm and j denotes each major industry division (based on the U.S. Department of Labor classification scheme). $RESILIENCE_k$, $ESGconsistency_k$, and $ESGadaptability_k$ represent the array of measures for a firm's resilience, ESG consistency and ESG adaptability, respectively. These variables display one single value per firm that is calculated based on time series data. $ESGengagement_{k,2019}$ and $Controls_{k,2019}$ denote a firm's ESG engagement and control variables, both at their 2019-fiscal year values (Ding et al., 2021; Fahlenbrach et al., 2021). ε_k is the random disturbance. The variance inflation factors (VIF) do not surpass the standard rule-of-thumb set at the threshold of 10 (Hair et al., 2005), thereby ruling out multicollinearity.

5. Results

5.1. The effect of ESG engagement on firm resilience

We perform preliminary regressions to assess the impact of ESG engagement on firm resilience as our baseline analyses to enhance comparability with prior research. Table A.4. of the Appendix presents these results. As Column (1) shows, the coefficient of *ESGengagement* is positive and statistically significant ($\gamma = 0.0124$; $p < 0.01$). This confirms that a firm's degree of ESG is a significant predictor of firm resilience: stronger ESG-engaged firms experience a weaker crash in their stock market value over a 12-month time horizon. If *ESGengagement* rises by one standard deviation, *Severity of shock (*12-month*)* increases by 2.40 percentage points. This finding supports the insurance advantages granted by ESG upon the occurrence of negative shocks (Godfrey, 2005; Godfrey et al., 2009; Lins et al., 2017; Shiu and Yang, 2017; Jia et al., 2020; Flammer and Ioannou, 2021; Amiraslani et al., 2023). Columns (2) to (3) repeat these regressions by relying on pillar scores. Evidence remains robust in the environmental and social pillars of ESG. In contrast, *GOV* displays no significant influence ($\gamma = -0.000$; $p > 0.10$), which concurs with previous works attributing weaker risk-management ability to the governance pillar as a result of its poorer perceived sincerity due to its greater focus on primary stakeholders (Godfrey et al., 2009; Fuente et al., 2022, 2025).

Looking at the other dimension of resilience (namely, flexibility), Columns (5) to (8) present these estimations. ESG has no significant impact on this resilience dimension. Taken together, the evidence so far leads us to conclude that ESG engagement mitigates the shock but does not meaningfully help firms to recover earlier. With regard to the control variables, larger, older and more profitable companies exhibit stronger resilience in the stability dimension. In contrast, greater leverage, capital intensity and operating efficiency reduce firm stability resilience. Larger size also significantly enhances resilience in terms of shortening the time to recover from the shock. Business diversification generally displays no statistical impact. This evidence contrasts with Kuppuswamy and Villalonga (2016) for the financial crisis, during which they find that the advantages of financial markets of diversified firms improve the value-effect of this strategy. Corporate governance characteristics reveal no statistical significance.

5.2. The impact of ESG consistency on firm resilience

Hypothesis 1 predicts that greater temporal ESG consistency strengthens a firm's resilience. Table 2 presents the empirical testing. Panel A focuses on the stability dimension of resilience. Column (1) reveals that the coefficient of *ESGconsistency* is positive and statistically significant ($\gamma = 0.120$; $p < 0.01$). By assessing the economic significance of this effect, a one-standard deviation rise in *ESGconsistency* causes a 1.41 percentage point increase in resilience stability (or put equivalently, leads to a stock market loss after the shock that is 1.41 percentage points lower). Column (2) re-estimates the effect of ESG consistency, controlling for ESG engagement so as to conduct a multidimensional examination of ESG. Our findings remain robust. It is worth noting that the economic size of the effect

of ESG consistency ($\gamma = 0.139$; $p < 0.01$) is more than 10 times as great as the effect of ESG engagement ($\gamma = 0.013$; $p < 0.01$). For example, a one-percentage point increase in *ESGconsistency* prevents a stock market loss (resilience stability) of 0.14 percentage points upon the COVID-19 shock, whereas the same increase in *ESGengagement* constrains stock market loss by almost 0.01 percentage points. Altogether, these findings strongly support Hypothesis 1; namely, that a firm's stronger ESG consistency enhances the stability dimension of firm resilience.

Panel B of Table 2 estimates the effect of ESG consistency on the flexibility dimension of resilience. Here, there is no support for Hypothesis 1. The coefficient of *ESGconsistency* is negative but lacks statistical significance.[16] More consistent ESG engagement over time shortens the time a firm's takes to recover its pre-shock closing price. However, this effect is neither economically nor statistically significantly different from zero ($\gamma = -0.258$; $p > 0.10$). *ESGengagement* displays no statistical significance, not even when considered together with *ESGconsistency*.

Moreover, we evaluate the temporal consistency of a firm's ESG engagement by accounting for the evolution of each of the three pillars separately: *ENVconsistency*, *SOCconsistency*, and *GOVconsistency*, respectively. In addition, we compute the equally-weighted average of these three measures to obtain an alternative proxy for a firm's overall ESG consistency (*Meanpillarconsistency*). Table 3 reports these analyses. As earlier, consistency in ESG shows no significant association with the flexibility dimension of resilience (Panel B). However, the stability dimension of firm resilience paints a different picture and supports Hypothesis 1. When considering ESG consistency as a whole (*Meanpillarconsistency*), we obtain similar evidence to previous sections. We notice some differences between pillars: consistency in a firm's performance scoring in the environmental and social pillars yields no significant coefficients, whereas consistency in the governance pillar does display a positive and statistically significant effect on resilience stability ($\gamma = 0.056$; $p < 0.05$). This finding may arise due to the weaker ability of the governance pillar –which is more self-serving and associated with primary stakeholders– to convey greater sincerity of a firm's ESG (Godfrey et al., 2009; Fuente et al., 2022, 2025).

5.3. The effect of ESG adaptability on firm resilience

Hypothesis 2 affirms that greater ESG adaptability positively influences firm resilience. Table 4 displays the test results. Reallocation of a firm's ESG efforts across pillars (considering a two-year horizon) does not pay off in terms of resilience stability (*ESGadaptability2y*). Interestingly, when we consider the extent to which ESG efforts are reallocated in favour of the social pillar, the coefficient of *SOCadaptability2y* is positive and possesses statistical significance at the 10% level ($\gamma = 0.030$; $p < 0.10$). If *SOCadaptability2y* increases by one standard deviation, resilience stability increases by 0.89 percentage points, which means that stock market loss upon the pandemic shock is constrained by 0.89 percentage points. These results partially support Hypothesis 2. ESG adaptability plays a major role in strengthening resilience by mitigating the economic losses suffered from the shock, although this effect is only significant if the firm focuses its reallocation efforts in favour of the social pillar of sustainability. This is consistent with the specific nature of the COVID-19 shock, which is strongly linked to a firm's relationship management with the community. It thus requires firms to reinforce ESG actions in the social pillar in order to reach a better and more timely alignment of their ESG engagement with the critical matters in the stakeholder environment. We conduct robustness checks based on a one-year horizon in order to appraise ESG reallocation (*ESGadaptability1y* and *SOCadaptability1y*) and we obtain similar evidence.[17]

In Table 5, we test the association between ESG adaptability and the flexibility dimension of firm resilience. Contrary to our predictions, we find no significant effect of ESG adaptability (*ESGadaptability2y*) on *Time to recovery* ($\gamma = 0.006$; $p > 0.10$). Results are robust to the focus of the adaptability measure to the specific efforts devoted to the social pillar (*SOCadaptability2y*). Therefore, Hypothesis 2 is not supported in terms of shorter time of recovery (resilience flexibility). A firm's actions to reallocate its ESG efforts across pillars do not help it to recover from the shock any earlier. Consistent with the findings commented previously, the effect of *ESGengagement* on this same dimension of resilience possesses no statistical significance.

5.4. Full models

We examine the estimation of full models simultaneously considering the two dynamic aspects of ESG (ESG consistency and ESG adaptability), in addition to a firm's degree of ESG engagement. These models allow a more comprehensive and robust test of our hypotheses. P-values of the F-statistic support the joint significance of the coefficients of the regressors. Table 6 displays these estimations.

Looking at Panel A, ESG consistency enhances the stability dimension of resilience by constraining stock market losses upon the adverse shock. A firm's engagement in ESG also has a positive impact on resilience stability. We confirm that the positive effect of ESG adaptability (in terms of *SOCadaptability2y*) on resilience stability documented in earlier results persists when ESG consistency is also controlled for in the regressions. However, the economic size of the effect of the former decreases. This points to a more prominent role of a firm's consistent ESG behaviour over time than the role of adaptability of ESG actions as a response to the shock. ESG consistency may already be capturing a part of the effect of ESG adaptability, and for this reason this latter variable may reduce the size of its

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[16] The latest research works underscore the ability of non-significant results to convey rich information (Abadie, 2020) and alleviate bias in estimations (Andrews and Kasy, 2019). Our evidence about the lack of significance of the ESG for shortening the time to recovery (resilience flexibility) helps us to conclude that the effect of ESG consistency on firm resilience is primarily driven by curbing the economic losses upon the shock. Such less severe economic losses may downplay the relevance of the impact of ESG on recovery directly.

[17] Results are available upon request.

Table 2
The effect of ESG consistency on corporate resilience.

| | Panel A:
Stability dimension of corporate resilience | | Panel B:
Flexibility dimension of corporate resilience | |
| | Dependent variable:
Severity of shock (12-month) | | Dependent variable:
Time to recovery | |
	(1)	(2)	(3)	(4)
Constant	−0.6591***	−0.5000***	1.8530***	2.0300***
	(0.0712)	(0.0844)	(0.6539)	(0.7809)
ESG consistency				
ESGconsistency	0.1197***	0.1391***	−0.2582	−0.2360
	(0.0434)	(0.0436)	(0.3976)	(0.4013)
ESG engagement				
ESGengagement		0.0134***		0.0147
		(0.00349)		(0.0356)
Controls				
SIZE	0.0110***	0.0020	−0.0928**	−0.1029**
	(0.0043)	(0.0050)	(0.0396)	(0.0465)
AGE	0.0142**	0.0111*	0.0418	0.0385
	(0.0061)	(0.0061)	(0.0560)	(0.0566)
INTANGIBLE	0.0443*	0.0454*	0.2915	0.2931
	(0.0266)	(0.0264)	(0.2427)	(0.2428)
OPEFFICIENCY	−0.0107	−0.0130	0.2247**	0.2217**
	(0.0102)	(0.0102)	(0.0948)	(0.0950)
PROFITABILITY	0.2256***	0.2216***	0.4186	0.4143
	(0.0376)	(0.0374)	(0.3423)	(0.3426)
LEVERAGE	−0.2270***	−0.2172***	0.3887	0.3998
	(0.0293)	(0.0293)	(0.2673)	(0.2688)
CAPITALINT	−0.3308**	−0.3326**	2.7240**	2.7238**
	(0.1397)	(0.1390)	(1.2944)	(1.2949)
dumDIVER	−0.0171	−0.0198*	−0.0367	−0.0399
	(0.0105)	(0.0105)	(0.0963)	(0.0966)
BOARDSIZE	−0.0100	−0.0180	−0.0263	−0.0351
	(0.0259)	(0.0259)	(0.2379)	(0.2390)
BOARDINDEP	0.0599	0.0175	0.1794	0.1327
	(0.0478)	(0.0490)	(0.4391)	(0.4534)
BOARDDIV	0.0292	0.0010	0.3039	0.2741
	(0.0467)	(0.0472)	(0.4294)	(0.4355)
dumCEOduality	0.0057	0.0101	0.0053	0.0101
	(0.0099)	(0.0099)	(0.0907)	(0.0915)
STROWNERSHIP	0.0177	0.0258	0.0044	0.0137
	(0.0328)	(0.0328)	(0.3001)	(0.3011)
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	1,164	1,164	1,137	1,137
F-statistic	14.13***	14.17***	2.14***	2.05***
Adjusted R^2	0.1917	0.1994	0.0207	0.0199

This table reports cross-sectional OLS regressions of the impact of ESG consistency (as measured by *ESGconsistency*) on the two dimensions of firm resilience: resilience stability (Panel A), and resilience adaptability (Panel B). In Panel A, the dependent variable is *Severity of shock (*12-month*)*, which is the change in each firm's stock price between the pre-shock closing price (on 30 January 2020) and the lowest stock price observed in the 12-month horizon, divided by the pre-shock closing price. In Panel B, the dependent variable is *Time to recovery*, calculated as the natural logarithm of the number of days it takes a firm's stock price to recover its pre-shock closing price (30 January 2020). Columns (2) and (4) additionally account for a firm's ESG engagement (*ESGengagement*), computed as the average of the three pillar scores (environmental, social, and governance). *ENV, SOC* and *GOV* measure a firm's sustainability engagement by individual pillars of environmental, social, and governance, respectively. A firm's size (*SIZE*), age (*AGE*), intangible assets (*INTANGIBLE*), operating efficiency (*OPEFFICIENCY*), profitability (*PROFITABILITY*), leverage (*LEVERAGE*), capital intensity (*CAPITALINT*), business diversification (*dumDIVER*), board size (*BOARDSIZE*), board independence (*BOARDINDEP*), board gender diversity (*BOARDDIV*), the presence of CEO duality (*dumCEOduality*), and strategic ownership (*STROWNERSHIP*) are controlled in all regressions. Industry fixed effects are also included. Standard errors are displayed in parentheses under coefficients. ***, **, * indicate statistical significance at 1%, 5% and 10% levels, respectively.

economic impact when the two are entered together. Panel B of Table 7 contains the estimations for the flexibility dimension of resilience. Earlier evidence persists: a firm's ESG (neither its degree of ESG engagement, nor its ESG consistency over time nor its ESG adaptability) has no significant influence on firm resilience as far as the time taken to recover from the shock is concerned.

Finally, we estimate the full models of equation [5] expanded with the two-way interaction effect between ESG consistency and ESG adaptability. This enables us to explore the distinctiveness of these two constructs more in depth and to rule out a potential joint

Table 3

The impact of ESG pillar consistency on corporate resilience: Robustness analyses by pillars.

	Panel A: Dependent variable: Severity of shock (12-month)				Panel B: Dependent variable: Time to recovery			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	−0.7085*** (0.0684)	−0.6907*** (0.0713)	−0.6539*** (0.0719)	−0.6370*** (0.0730)	1.9001*** (0.6257)	1.7046*** (0.6503)	2.0394*** (0.6607)	1.6925*** (0.6702)
ESG consistency								
ENVconsistency	0.0461 (0.0316)				−0.4628 (0.2865)			
SOCconsistency		0.0405 (0.0325)				−0.4418 (0.2955)		
GOVconsistency			0.0557** (0.0207)				0.0533 (0.1915)	
Meanpillarconsistency				0.1241*** (0.0415)				−0.4481 (0.3816)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,164	1,164	1,164	1,164	1,137	1,137	1,137	1,137
F-statistic	13.81***	13.77***	14.11***	14.21***	2.25***	2.23***	2.12***	2.19***
Adjusted R^2	0.1878	0.1874	0.1914	0.1926	0.0226	0.0223	0.0204	0.0215

This table reports cross-sectional OLS regressions of the impact of ESG pillar consistency (either *ENVconsistency, SOCconsistency*, or *GOVconsistency*, or the average of the three previous measures as computed by *Meanpillarconsistency*) on firm resilience stability (Panel A), and resilience adaptability (Panel B). In Panel A, the dependent variable is *Severity of shock (*12-month*)*, which is the change in each firm's stock price between the pre-shock closing price (on 30 January 2020) and the lowest stock price observed in the 12-month horizon, divided by the pre-shock closing price. In Panel B, the dependent variable is *Time to recovery*, calculated as the natural logarithm of the number of days it takes a firm's stock price to recover its pre-shock closing price (30 January 2020). A firm's size (*SIZE*), age (*AGE*), intangible assets (*INTANGIBLE*), operating efficiency (*OPEFFICIENCY*), profitability (*PROFITABILITY*), leverage (*LEVERAGE*), capital intensity (*CAPITALINT*), business diversification (*dumDIVER*), board size (*BOARDSIZE*), board independence (*BOARDINDEP*), board gender diversity (*BOARDDIV*), the presence of CEO duality (*dumCEOduality*), and strategic ownership (*STROWNERSHIP*) are controlled in all regressions. Industry fixed effects are also included. Standard errors are displayed in parentheses under coefficients. ***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

Table 4
The impact of ESG adaptability on corporate resilience (the stability dimension).

| | Dependent variable: *Severity of shock (*12-month*)* | | | |
| | ESG adaptability | | ESG adaptability and ESG engagement | |
	(1)	(2)	(3)	(4)
Constant	−0.7269***	−0.7416***	−0.5957***	−0.6094***
	(0.0663)	(0.0664)	(0.0786)	(0.0787)
ESG adaptability				
ESGadaptability2y	0.0003		−0.0007	
	(0.0022)		(0.0022)	
SOCadaptability2y		0.0302*		0.0308*
		(0.0159)		(0.0159)
ESG engagement				
ESGengagement			0.0117**	0.0118***
			(0.0038)	(0.0038)
Controls				
SIZE	0.0151***	0.0154***	0.0076	0.0078
	(0.0041)	(0.0041)	(0.0048)	(0.0048)
AGE	0.0198***	0.0198***	0.0172***	0.0172***
	(0.0058)	(0.0057)	(0.0058)	(0.0058)
INTANGIBLE	0.0286	0.0293	0.0287	0.0294
	(0.0259)	(0.0259)	(0.0058)	(0.0258)
OPEFFICIENCY	−0.0119	−0.0125	−0.0140	−0.0147*
	(0.0100)	(0.0101)	(0.0101)	(0.0101)
PROFITABILITY	0.1994***	0.2001***	0.1981***	0.1987***
	(0.0362)	(0.0361)	(0.0360)	(0.0360)
LEVERAGE	−0.2286***	−0.2279***	−0.2215***	−0.2205***
	(0.0287)	(0.0287)	(0.0287)	(0.0287)
CAPITALINT	−0.3215**	−0.3054**	−0.3239**	−0.3079**
	(0.1389)	(0.1389)	(0.1384)	(0.1385)
dumDIVER	−0.0202*	−0.0197*	−0.0228**	−0.0222**
	(0.0104)	(0.0104)	(0.0104)	(0.0104)
BOARDSIZE	−0.0142	−0.0149	−0.0206	−0.0214
	(0.0253)	(0.0253)	(0.0253)	(0.0253)
BOARDINDEP	0.0464	0.0468	0.0072	0.0077
	(0.0456)	(0.0455)	(0.0472)	(0.0471)
BOARDDIV	0.0157	0.0124	−0.0066	−0.0100
	(0.0458)	(0.0457)	(0.0462)	(0.0461)
dumCEOduality	0.0102	0.0104	0.0143	0.0144
	(0.0097)	(0.0097)	(0.0098)	(0.0098)
STROWNERSHIP	0.0252	0.0286	0.0324	0.0355
	(0.0319)	(0.0318)	(0.0319)	(0.0318)
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	1,207	1,207	1,207	1,207
F-statistic	13.58***	13.80***	13.49***	13.70***
Adjusted R²	0.1797	0.1822	0.1856	0.1881

This table reports cross-sectional OLS regressions of the impact of ESG adaptability (either *ESGadaptability2y* or *ESGsocial2y*) on firm resilience stability. The dependent variable is *Severity of shock (*12-month*)*, which is the change in each firm's stock price between the pre-shock closing price (on 30 January 2020) and the lowest stock price observed in the 12-month horizon, divided by the pre-shock closing price. Panel A excludes a firm's ESG engagement (*ESGengagement*) and Panel B additionally accounts for it. A firm's size (*SIZE*), age (*AGE*), intangible assets (*INTANGIBLE*), operating efficiency (*OPEFFICIENCY*), profitability (*PROFITABILITY*), leverage (*LEVERAGE*), capital intensity (*CAPITALINT*), business diversification (*dum-DIVER*), board size (*BOARDSIZE*), board independence (*BOARDINDEP*), board gender diversity (*BOARDDIV*), the presence of CEO duality (*dum-CEOduality*), and strategic ownership (*STROWNERSHIP*) are controlled in all regressions. Industry fixed effects are also included. Columns (2) and (4) additionally control for a firm's ESG engagement (*ESGengagement*). Standard errors are displayed in parentheses under coefficients. ***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

effect. These are reported in Table 7. Although *SOCadaptability2y* loses its weak statistical significance, our previous results are robust. The interaction effects generally contain weak or null statistical significance, thus suggesting that ESG consistency and ESG adaptability mainly shape firm resilience separately. When considering its joint effect, ESG adaptability may impair a part of the beneficial effect arising from ESG consistency since the former construct stems from a shorter-term response to a shock which alters the ESG path followed by each firm over the long-term.

Table 5
The impact of ESG adaptability on corporate resilience (the flexibility dimension).

	Dependent variable: *Time to recovery*			
	ESG adaptability		ESG adaptability and ESG engagement	
	(1)	(2)	(3)	(4)
Constant	2.2515***	2.3344***	2.5154***	2.5910***
	(0.6103)	(0.6115)	(0.7273)	(0.7293)
ESG adaptability				
ESGadaptability2y	0.0065		0.0071	
	(0.0200)		(0.0200)	
SOCadaptability2y		−0.1172		−0.1164
		(0.1460)		(0.1460)
ESG engagement				
ESGengagement			0.0234	0.0227
			(0.0351)	(0.0351)
Controls				
SIZE	−0.1088***	−0.1101***	−0.1241***	−0.1250***
	(0.0384)	(0.0384)	(0.0448)	(0.0448)
AGE	0.0544	0.0519	0.0496	0.0470
	(0.0532)	(0.0529)	(0.0537)	(0.0534)
INTANGIBLE	0.3222	0.3209	0.3232	0.3220
	(0.2381)	(0.2381)	(0.2382)	(0.2381)
OPEFFICIENCY	0.1970**	0.1985**	0.1922**	0.1937**
	(0.0939)	(0.0939)	(0.0942)	(0.0942)
PROFITABILITY	0.3534	0.3520	0.3512	0.3499
	(0.3308)	(0.3308)	(0.3309)	(0.3309)
LEVERAGE	0.4393*	0.4419*	0.4540*	0.4565*
	(0.2630)	(0.2627)	(0.2640)	(0.2638)
CAPITALINT	2.3869*	2.3060*	2.3850*	2.3037*
	(1.2924)	(1.2945)	(1.2927)	(1.2948)
dumDIVER	0.0037	0.0032	−0.0018	−0.0020
	(0.0960)	(0.0960)	(0.0964)	(0.0963)
BOARDSIZE	−0.0962	−0.0931	−0.1087	−0.1052
	(0.2333)	(0.2332)	(0.2341)	(0.2340)
BOARDINDEP	0.1352	0.1394	0.0572	0.0643
	(0.4207)	(0.4203)	(0.4367)	(0.4362)
BOARDDIV	0.3252	0.3384	0.2842	0.2986
	(0.4209)	(0.4211)	(0.4255)	(0.4257)
dumCEOduality	−0.0126	−0.0145	−0.0047	−0.0070
	(0.0894)	(0.0894)	(0.0902)	(0.0901)
STROWNERSHIP	0.0288	0.0072	0.0438	0.0210
	(0.2925)	(0.2921)	(0.2935)	(0.2930)
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	1,180	1,180	1,180	1,180
F-statistic	2.38***	2.41***	2.29***	2.32***
Adjusted R^2	0.0240	0.0245	0.0235	0.0422

This table reports cross-sectional OLS regressions of the impact of ESG adaptability (either *ESGadaptability2y* or *ESGsocial2y*) on firm resilience flexibility. The dependent variable is *Time to recovery*, calculated as the natural logarithm of the number of days it takes a firm's stock price to recover its pre-shock closing price (30 January 2020). Panel A excludes a firm's ESG engagement (*ESGengagement*) and Panel B additionally accounts for it. A firm's size (*SIZE*), age (*AGE*), intangible assets (*INTANGIBLE*), operating efficiency (*OPEFFICIENCY*), profitability (*PROFITABILITY*), leverage (*LEVERAGE*), capital intensity (*CAPITALINT*), business diversification (*dumDIVER*), board size (*BOARDSIZE*), board independence (*BOARDINDEP*), board gender diversity (*BOARDDIV*), the presence of CEO duality (*dumCEOduality*), and strategic ownership (*STROWNERSHIP*) are controlled in all regressions. Industry fixed effects are also included. Columns (2) and (4) additionally control for a firm's ESG engagement (*ESGengagement*). Standard errors are displayed in parentheses under coefficients. ***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

6. Robustness analyses

We provide a series of robustness checks. First, we examine robustness when we apply the overall ESG score reported by LSEG as an alternative proxy for ESG engagement (and to derive ESG consistency). This is based on pillar scores calculated on the basis of its own methodology to account for industry-based materiality weighting of metrics. Our previous results persist with this alternative measurement.[18]

Second, given that the credibility inspired by a firm's ESG actions is likely to shape the influence of ESG consistency on firm resilience, we graphically depict the two-way linear predictions of the association between each dynamic aspect of ESG (ESG consistency and ESG adaptability) and the stability dimension of resilience, which were the variables displaying statistical significance in

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[18] These results are available upon request.

Table 6
Full models.

	Panel A: Stability dimension of corporate resilience				Panel B: Flexibility dimension of corporate resilience			
	Dependent variable: Severity of shock (12-month)				Dependent variable: Time to recovery			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	−0.6740***	−0.6901***	−0.5143***	−0.5304***	1.8252***	1.9456***	2.0319**	2.1380***
	(0.0720)	(0.0725)	(0.0854)	(0.0858)	(0.6646)	(0.6696)	(0.7944)	(0.7988)
ESG consistency								
ESGconsistency	0.1123**	0.1073**	0.1334***	0.1268***	−0.2945	−0.2966	−0.2665	−0.2723
	(0.0444)	(0.0439)	(0.0446)	(0.0440)	(0.4083)	(0.4039)	(0.4127)	(0.4077)
ESG adaptability								
ESGadaptability2y	0.0008		0.0013		0.0066		0.0072	
	(0.0023)		(0.0023)		(0.0208)		(0.0208)	
SOCadaptability2y		0.0282*		0.0290*		−0.1693		−0.1685
		(0.0162)		(0.0162)		(0.1491)		(0.1492)
ESG engagement								
ESGengagement			0.0134***	0.0133***			0.0171	0.0159
			(0.0039)	(0.00394)			(0.0360)	(0.0360)
Controls								
SIZE	0.0120***	0.0122***	0.0030	0.0032	−0.0883**	−0.0902**	−0.1000**	−0.1011**
	(0.0043)	(0.0043)	(0.0050)	(0.0050)	(0.0400)	(0.0400)	(0.0471)	(0.0470)
AGE	0.0161***	0.0163***	0.0131**	0.0132**	0.0451	0.0411	0.0415	0.0376
	(0.0062)	(0.0062)	(0.0062)	(0.0062)	(0.0569)	(0.0567)	(0.0574)	(0.0573)
INTANGIBLE	0.0468*	0.0475*	0.0480*	0.0487*	0.2975	0.2954	0.2996	0.2974
	(0.0267)	(0.0067)	(0.0266)	(0.0065)	(0.2450)	(0.2448)	(0.2451)	(0.2450)
OPEFFICIENCY	−0.0092	−0.0099	−0.0113	−0.0121	0.2438**	0.2463**	0.2406**	0.2431**
	(0.0104)	(0.0104)	(0.0104)	(0.0104)	(0.0971)	(0.0971)	(0.0974)	(0.0974)
PROFITABILITY	0.2167***	0.2164***	0.2132***	0.2129***	0.3575	0.3632	0.3532	0.3592
	(0.0380)	(0.0379)	(0.0378)	(0.0377)	(0.3475)	(0.3473)	(0.3477)	(0.3476)
LEVERAGE	−0.2259***	−0.2253***	−0.2170***	−0.2162***	0.3952	0.3982	0.4070	0.4093
	(0.0296)	(0.0295)	(0.0296)	(0.0295)	(0.2711)	(0.2708)	(0.2723)	(0.2721)
CAPITALINT	−0.3312**	−0.3149**	−0.3317**	−0.3156**	2.6721**	2.5512**	2.6724**	2.5513**
	(0.1400)	(0.1401)	(0.1393)	(0.1395)	(1.3023)	(1.3050)	(1.3027)	(1.3055)
dumDIVER	−0.0172	−0.0165	−0.0203*	−0.0195*	−0.0379	−0.0393	−0.0421	−0.0431
	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0978)	(0.0977)	(0.0982)	(0.0981)
BOARDSIZE	−0.0169	−0.0176	−0.0254	−0.0261	−0.0491	−0.0439	−0.0597	−0.0537
	(0.0261)	(0.0261)	(0.0261)	(0.0261)	(0.2406)	(0.2405)	(0.2417)	(0.2416)
BOARDINDEP	0.0695	0.0710	0.0260	0.0279	0.1455	0.1443	0.0896	0.0929
	(0.0481)	(0.0480)	(0.0495)	(0.0494)	(0.4440)	(0.4435)	(0.4594)	(0.4587)
BOARDDIV	0.0161	0.0130	−0.0116	−0.0147	0.2912	0.3090	0.2581	0.2782
	(0.0473)	(0.0472)	(0.0478)	(0.0477)	(0.4352)	(0.4352)	(0.4409)	(0.4409)
dumCEOduality	0.0055	0.0060	0.0100	0.0105	0.0072	0.0034	0.0128	0.0086
	(0.0100)	(0.0100)	(0.0100)	(0.0100)	(0.0918)	(0.0918)	(0.0926)	(0.0926)
STROWNERSHIP	0.0219	0.0246	0.0293	0.0316	0.0195	−0.0096	0.0296	−0.0008
	(0.0333)	(0.0332)	(0.0332)	(0.0331)	(0.3054)	(0.3049)	(0.3063)	(0.3056)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,142	1,142	1,142	1,142	1,116	1,116	1,116	1116
F-statistic	13.10***	13.26***	13.16***	13.32***	2.00***	2.06***	1.92***	1.98***
Adjusted R²	0.1891	0.1912	0.1969	0.1989	0.0194	0.0205	0.0187	0.0198

This table reports cross-sectional OLS regressions of the full models corresponding to equation [5]. They estimate the impact of ESG consistency (*ESGconsistency*), ESG adaptability (either *ESGadaptability2y* or *ESGsocial2y*) and ESG engagement (*ESGengagement*) on firm resilience stability (Panel A), and resilience adaptability (Panel B). In Panel A, the dependent variable is *Severity of shock (*12-month*)*, which is the change in each firm's stock price between the pre-shock closing price (on 30 January 2020) and the lowest stock price observed in the 12-month horizon, divided by the pre-shock closing price. In Panel B, the dependent variable is *Time to recovery*, calculated as the natural logarithm of the number of days it takes a firm's stock price to recover its pre-shock closing price (30 January 2020). A firm's size (*SIZE*), age (*AGE*), intangible assets (*INTANGIBLE*), operating efficiency (*OPEFFICIENCY*), profitability (*PROFITABILITY*), leverage (*LEVERAGE*), capital intensity (*CAPITALINT*), business diversification (*dumDIVER*), board size (*BOARDSIZE*), board independence (*BOARDINDEP*), board gender diversity (*BOARDDIV*), the presence of CEO duality (*dumCEOduality*), and strategic ownership (*STROWNERSHIP*) are controlled in all regressions. Industry fixed effects are also included. Standard errors are displayed in parentheses under coefficients. ***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

our previous regression analyses. We depict the results by subsamples of above-median and below-median ESG engagement. Figures A.4. and A.5. of the Appendix plot the resulting line from the linear regressions, together with a 95% confidence interval of the prediction, which is highlighted in grey. Looking at Figure A.4., greater ESG consistency is linked to a more pronounced resilience

Table 7
Extended full models including the interaction effect between ESG consistency and ESG adaptability.

	Panel A: Stability dimension of corporate resilience		Panel B: Flexibility dimension of corporate resilience	
	Dependent variable: *Severity of shock (*12-month*)*		Dependent variable: *Time to recovery*	
	(1)	(2)	(4)	(5)
Constant	−0.5021***	−0.5322***	1.9332**	2.0962***
	(0.0857)	(0.0861)	(0.7958)	(0.8007)
ESG consistency				
ESGconsistency	0.2049***	0.1087	−0.9101	−0.6730
	(0.0608)	(0.0711)	(0.5579)	(0.6530)
ESG adaptability				
ESGadaptability2y	−0.0027		0.0444	
	(0.0032)		(0.0301)	
SOCadaptability2y		0.0346		−0.0433
		(0.0237)		(0.2183)
ESG engagement				
ESGengagement	0.0129***	0.0134***	0.0216	0.0170
	(0.0039)	(0.0039)	(0.0361)	(0.0359)
Interaction effects				
ESGconsistency × ESGadaptability2y	−0.0282*		0.2599*	
	(0.0164)		(0.1517)	
ESGconsistency × SOCadaptability2y		0.0463		1.0329
		(0.1429)		(1.3146)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	1,142	1,142	1,116	1,116
F-statistic	12.76***	12.76***	1.97***	1.92***
Adjusted R²	0.1983	0.1983	0.0205	0.0194

This table reports cross-sectional OLS regressions of the full models corresponding to equation [5], expanded with the two-way interaction effect between ESG consistency and ESG adaptability. They estimate the impact of ESG consistency (*ESGconsistency*), ESG adaptability (either *ESGadaptability2y* or *ESGsocial2y*) and ESG engagement (*ESGengagement*) on firm resilience stability (Panel A), and resilience adaptability (Panel B). In Panel A, the dependent variable is *Severity of shock (*12-month*)*, which is the change in each firm's stock price between the pre-shock closing price (on 30 January 2020) and the lowest stock price observed in the 12-month horizon, divided by the pre-shock closing price. In Panel B, the dependent variable is *Time to recovery*, calculated as the natural logarithm of the number of days it takes a firm's stock price to recover its pre-shock closing price (30 January 2020). A firm's size (*SIZE*), age (*AGE*), intangible assets (*INTANGIBLE*), operating efficiency (*OPEFFICIENCY*), profitability (*PROFIT-ABILITY*), leverage (*LEVERAGE*), capital intensity (*CAPITALINT*), business diversification (*dumDIVER*), board size (*BOARDSIZE*), board independence (*BOARDINDEP*), board gender diversity (*BOARDDIV*), the presence of CEO duality (*dumCEOduality*), and strategic ownership (*STROWNERSHIP*) are controlled in all regressions. Industry fixed effects are also included. Standard errors are displayed in parentheses under coefficients. ***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

stability increase in the group of companies with poorer ESG engagement, which agrees with our contentions that the signal from ESG consistency is more important for poorer ESG performing companies. These latter have a greater need to convey the sincerity of their ESG. Similarly, Figure A.5. Shows that stronger ESG adaptability has a positive association with resilience stability in the subsample of below-median ESG-engaged firms, thus again revealing that the alignment of ESG to actual stakeholders' critical issues is a plus to promote resilience stability for poorer ESG performers whose actions enjoy less credibility.

Third, we formally estimate the moderating role of a firm's ESG engagement in the association between ESG consistency and stability resilience (which was the one exhibiting statistical significance in the baseline analyses). This helps us to elucidate whether ESG consistency is partly shaped by the level of a firm's ESG. In stronger ESG-engaged firms, consistency is likely to become a less valuable attribute because outsiders may perceive less asymmetries of information about each firm's ESG. Results are in Table A.5. of the Appendix. Column (1) considers ESG engagement as a continuous variable: the interaction term *ESGconsistency × ESGengagement* exhibits a negative but not statistically significant coefficient ($\gamma = -0.029; p > 0.10$). Column (2) re-estimates using a binary variable to compute the interaction effects: *dumESGsample* equals one if a firm's ESG engagement is above the sample median, and zero otherwise. The coefficient of *ESGconsistency × dumESGsample* is negative and in this case displays statistical significance ($\gamma = -0.141; p < 0.10$). Consistent with our arguments, this confirms that the positive effect of ESG consistency on resilience stability decreases, the stronger the ESG engagement which the firm displays. Our evidence suggests that a one percentage-point increase in ESG consistency increases *Severity of shock (*12-month*)* by 0.20 percentage points in below-median ESG-engaged companies, but that the same change in ESG consistency increases *Severity of shock (*12-month*)* by only 0.06 percentage points (0.204-0.141 = 0.063) in their above-median ESG-engaged counterparts. Column (3) presents robustness analyses using an alternative binary variable to identify a firm's relative ESG engagement based on that of their industry peers (*dumESGindustry* equal to one if a firm's ESG engagement is above the industry median, zero otherwise). Overall, these results concur with our contentions that stronger ESG-engaged firms are better able to stimulate stakeholder credibility, thus downplaying the role of other ESG characteristics to signal the ESG genuineness.

To help interpret these two-way interaction effects, Figure A.6. of the Appendix graphically represents the association between ESG consistency and the stability dimension of resilience by subsamples of ESG engagement. We confirm that greater ESG consistency

mainly constrains stock market losses from the COVID-19 shock (or in other words, it enhances resilience stability) for the group of companies with below-median ESG engagement. These latter firms are more likely to require additional signals for their ESG strategies to gain credibility from stakeholders. In contrast, in the subsample of above-median ESG-engaged firms, the association between ESG consistency and resilience stability exhibits a weaker change across different ESG consistency levels, thus depicting a flatter line.

Forth, some complementary analyses are carried out to examine whether the effect of ESG consistency on stability resilience is shaped by two potential moderators. On the one hand, we explore whether the beneficial impact of ESG consistency may be impaired when a firm improves its ESG engagement over time. To this aim, we compute the interaction effect of *ESGconsistency* with two alternative proxies for ESG variation over time: the difference between a firm's ESG engagement in 2019 (the fiscal year of reference in the control variables of our cross-sectional models) and the mean of its ESG engagement during the pre-shock years (2011-2019) (denoted by *ΔESG1*); and the difference between a firm's average ESG engagement in the post-shock years (2020-2021) and the mean of its ESG engagement during the pre-shock years (2011-2019) (*ΔESG2*). Table A.6. of the Appendix tabulates the results. The interaction effect presents weak significance in both economic and statistical terms (-0.073; $p < 0.10$). Consequently, although a temporal trend of improvement of ESG engagement may slightly draw the spotlight away from its track record over time, the positive effect of *ESGconsistency* on *Severity of shock (*12-month*)* strongly persists.[19] We examine whether the impact of ESG consistency on stability resilience is also shaped by consistency at the pillar level. Results appear in Table A.7. Only the interaction terms *ESGconsistency × ENVconsistency* and *ESGconsistency × SOCconsistency* are positive and statistically significant (0.149, $p < 0.10$; and 0.375, $p < 0.01$, respectively), thus suggesting that ESG consistency reduces value losses from the shock to a greater extent when also accompanied by greater consistency in performance at the environmental and social pillar level. The economic size is more than twice as large for this latter pillar. This is consistent with our previous results that attributed greater importance to the social pillar of ESG for firm resilience, given the specific nature of the COVID-19 crisis.

Fifth, we conduct robustness checks by measuring firm resilience stability through the *Severity of shock (*18-month*)* and *Severity of shock (*24-month*)* proxies. Table A.8. of the Appendix summarizes the results. Our conclusions remain valid. It is worth acknowledging that the size of the economic effect of ESG consistency on resilience stability decreases the longer the time horizon applied. Results suggest that a more temporally consistent ESG engagement over time helps firms to constrain their stock market losses upon the shock in the short term. The economic impact of *ESGconsistency* on resilience stability is about 1.19-1.22 times greater on *Severity of shock (*18-month*)* than on *Severity of shock (*24-month*)*. Again, stronger ESG engagement produces beneficial effects by improving resilience stability.

Sixth, to ensure that these findings are not driven by the time horizon considered to compute adaptability, we repeat the estimations by applying a shorter time window of analysis (namely, a one-year horizon) to a finer-grained appraisal of the immediate reaction of firms to the pandemic shock. Our findings also hold when using *ESGadaptability1y* or *SOCadaptability1y*[20]. Next, we repeat the analyses by our reliance on an alternative date for the COVID-19 shock: March 11, 2020, when the WHO declared the coronavirus outbreak to be a global pandemic. The results remain similar to those from our baseline specification.[21] Additionally, we re-estimate our results both only comprising and excluding the dominant industry in our sample; namely, the manufacturing industry (division D). Our main evidence persists.[22]

Moreover, we account for potential endogeneity concerns in our main model (eq. [5]). We test for exogeneity by using the Durbin–Wu–Hausman statistic. Its associated p-value exceeds 0.10 in the estimations of firm resilience flexibility, such that the null hypothesis of exogeneity is not rejected therein. OLS estimates are therefore more efficient and consistent than 2SLS results. Focusing on regressions of resilience stability as the dependent variable –which were the ones displaying significant OLS results– we implement an instrumental variable methodology (Hill et al., 2021) such as two-stage least squares (2SLS), reported in Table A.9. of the Appendix. We instrument ESG engagement, ESG consistency, and ESG adaptability simultaneously.[23] Tests support instrument relevance and validity. Although the Durbin-Wu-Hausman test leads to the exogeneity hypothesis being rejected, our main findings still hold. ESG consistency significantly improves resilience stability. Due to the lack of R&D data, these instrumental variable models limit their sample size to 595 observations, which impairs the statistical significance of ESG adaptability in these regressions.

Finally, we explore some potential underlying mechanisms of our findings. We focus on the relationship between ESG consistency and the stability dimension of resilience, which was the statistically significant one in our analyses. We investigate whether this association is driven by actual actions/behaviours of managers or by perceptions/evaluations of investors in the market. Accordingly, we

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[19] These results are consistent with the fact that our measure for ESG consistency based on Wang and Choi (2013) has the advantage over a simple standard deviation measure that it corrects for temporal trends, as we explained in the variable section earlier.

[20] Results are available upon request.

[21] Results are available upon request.

[22] We acknowledge an anonymous reviewer for this insight. The manufacturing industry (division D) accounts for 705 firm-year observations (54.57% of the total sample). Findings are robust, yet it is only noticeable that *ESGconsistency* loses its statistical significance in the subsample excluding the manufacturing industry. Although the size reduction of the sample in these subsample estimations may play a part, this might also suggest that the dimension of ESG consistency over time proves to be of particular importance in this industry, which has a larger population of companies and which are therefore likely to have a greater need to convey the genuineness of their ESG practices. Results are available upon request.

[23] As instruments, we consider the yearly industry mean of those three variables (Knyazeva et al., 2013) in addition to the three instruments used by Desjardine et al. (2019) for this same purpose: analyst coverage (the natural logarithm of one-year-ahead annual EPS forecasts issued by analysts), the natural logarithm of total employees, and the ratio of R&D expenses over total assets. We thank an anonymous reviewer for this suggestion.

evaluate whether the effect of ESG consistency is shaped by factors that are expected to improve managerial decision-making in ESG practices and by factors that shaped investors' perceptions. As far as the first group of factors is concerned, we consider the existence or otherwise of managerial compensation linked to ESG performance (as measured by the binary variable *dumESGcompensation*), and the presence or otherwise of an ESG committee (the binary variable *dumESGcommittee*). As regards the second group, we assess whether each firm conducts ESG information reporting or not (*dumESGreporting*), and its relative coverage by analysts (*dumAnalysts* equals one if a firm's analyst coverage in terms of the number of analysts following it is higher than the sample median, and zero otherwise). Table A.10. reports these findings. Only the term *ESGconsistency* × *dumESGreporting* displays statistical significance: its negative co-efficient (-0.1198, $p < 0.10$) indicates that the beneficial effect of *ESGconsistency* in improving resilience stability (*Severity of shock (*12-month*)*) decreases in firms with ESG reporting. Our results are likely to be mainly driven by perceptions from investors, who attach greater value to ESG consistency in the absence of alternative information devices to signal the quality of ESG engagement to outsiders.

7. Discussion and conclusion

This study investigates the role of a firm's engagement in ESG as a strategic tool to build firm resilience against adversity. We exploit the COVID-19 pandemic shock, which offers a recent natural experiment to test whether ESG is really a source of immunity to mitigate potential market crash losses. We theorize about the importance of taking a closer look at a firm's ESG track record in order to portray a more accurate analysis of how this strategy endows firms with stronger insurance benefits. Moreover, our two-fold decomposition of firm resilience advances a finer-grained understanding about how ESG provides firms with a competitive advantage to face adversity. Our findings reveal that the stability dimension of resilience is improved by greater temporal consistency of a firm's ESG engagement over time and by higher reallocation of ESG efforts across pillars in response to general stakeholders' most critical issues. In contrast, ESG consistency and ESG adaptability have no significant effect on the flexibility dimension of resilience and do not therefore significantly shorten recovery time from the shock. Interestingly, evidence suggests that those two longitudinally relative measures based on the record of accomplishment in ESG play a more salient role in firms with poorer ESG, for which signalling the sincerity of their lower ESG actions becomes of the utmost importance.

Taken together these insights contribute to the literature on several fronts. First, we extend research about the measurement of a firm's ESG strategy by introducing longitudinally relative measures in order to offer a more accurate appraisal of each firm's ESG track record. We overcome single-point time measurement of ESG scoring, which has led to puzzling evidence in previous research. Considering ESG consistency over time adds a dynamic viewpoint to exploring ESG temporality and brings fresh insights vis-à-vis promoting a comprehensive understanding of the root mechanisms of the insurance-like properties attached to this strategy, thereby meeting recent research demands (Wang et al., 2020). Together, the conceptualization and empirical testing of our hypotheses provide a solid conceptual framework which demonstrates that not only does the level of ESG matter when firms seek to gain resilience, but that the manner in which each firm manages its ESG involvement is key (as a whole, and as a reallocation between pillars) over time. To the best of our knowledge, this research is the first to theorize on and empirically test the impact of these longitudinally relative dimensions of ESG on firm resilience. By developing and empirically testing fresh quantitative measures to capture ESG shifts of pattern over time, we add to recent works such as Cheema-Fox et al. (2021), which are based on more qualitative approaches like language processing to gather a firm's business repurpose. Complementarily, in so doing, we advance a multidimensional approach to ESG (Bansal et al., 2015; Cuypers et al., 2016) in order to gain a more comprehensive knowledge of the differing ways in which firms become involved in this strategy in business practice. Most of the studies primarily based on ESG scoring have offered too narrow a picture. Our approach fosters a time-based focus to the pattern of ESG across firms and helps to overcome such a static analysis and to expand the lens through which we examine ESG sincerity. This proves to be a key addition in terms of reaping the advantages of this strategy (He and Harris, 2020; Fuente and Velasco, 2024).

Second, this study advances the literature on firm resilience, which has gained much attention since the coronavirus shock. We join the debate concerning the sources of firm immunity to unexpected and unfavourable shocks. By combining a longitudinal characterization of ESG strategy and its association with company resilience based on a two-fold decomposition into the dimensions of stability and flexibility, this study goes a step further relative to prior works that are constrained to firm performance measures and their volatility (Cheema-Fox et al., 2021; Yahya, 2023). The work also offers insights for a more accurate assessment of how ESG shapes resilience at different levels and looks at ESG through dynamic lenses beyond the distinction of time horizon of ESG practices already explored in earlier studies such as Desjardine et al. (2019). A firm's pattern of ESG strategy over time contributes differently to these two distinct dimensions of firm resilience: we show that it works to mitigate stock market losses but provides no support in shortening a firm's recovery from an adverse shock. Moreover, while previous research has primarily focused on ESG's impact on a firm's value (value creation), our research brings interesting theoretical and empirical insights based on a firm's ability to preserve value and endure in the long term. As a result, we differ in the viewpoint adopted to address the value process within firms. We also offer a different perspective into the underlying mechanisms of the insurance benefits of ESG, to which much literature has been devoted (Godfrey, 2005; Godfrey et al., 2009; Lins et al., 2017; Shiu and Yang, 2017; Jia et al., 2020; Flammer and Ioannou, 2021; Amiraslani et al., 2023), but which is by no means free from offering mixed evidence which shows that insurance through ESG is not generalizable universally (Abedifar et al., 2023; Yahya, 2023; Gianfrate et al., 2024). In particular, our study highlights that this cannot be assumed regardless of the pattern of ESG strategy that each firm implements, and it suggests the importance of looking at ESG as a multidimensional construct. We underscore the notion that companies may achieve dissimilar resilience outcomes since the manner in which they deploy their ESG over time may make a difference to the strength of the firm-stakeholder relationships forged. During adverse times, we illustrate how the urgency for firms is focused on surviving and recovering from the shock through resilience-enhancing strategies, which may not necessarily correspond to the most-value creating ones. The primacy of the value-creation objective may

become secondary in favour of ensuring company survival and protecting the future of all stakeholders.

From a practical standpoint, this research's findings are also valuable. We illustrate the benefits of enhancing the transparency and reporting standards of ESG. Conveying this complementary non-financial information of companies can promote the design and implementation of more efficient policies to strengthen firm resilience. This will in turn prove beneficial for stakeholders and for society as a whole since it can mitigate the portion of risk that firms bring to the whole economic system. Additionally, policymakers should do as much as they can to provide companies with standard regulations for ESG reporting at the international level in order to foster its comparability and interpretation, not only within firms from the same sector, but also across sectors and countries. Once a high-quality package of international reporting standards has been developed, it will be equally important to preserve their consistency over time so as to ensure a better follow-up of how each firm's ESG evolves, because this strategy requires long-range planning and implementation.

Our work is not without limitations, which may pose additional questions for future research. First, our study opens the door to comparing adverse shocks at different levels (e.g. market-based, industry-specific, and firm-specific) and to exploring how the different dimensions of ESG might curb each of these to a different degree.[24] Additionally, our research is primarily concerned with the short-term effects of the COVID-19 shock and leaves room to delve into longer-horizon adjustments,[25] which may bring interesting complementary insights. Second, one avenue for constructing further work might explore in greater depth the so-called "rater effect" in order to examine to what extent ESG data sources may affect analyses in ESG. Moreover, it will be enlightening to combine ESG ratings from different data providers in order to more accurately portray a firm's ESG strategy. This can only be achieved once ESG disclosure standards have been harmonized to a greater degree so as to avoid potential measurement disagreements (Chatterji et al., 2016; Berg et al., 2022). Third and relatedly, we invite scholars to refine and extend the measurement of ESG by adopting a relative perspective. The bulk of ESG measurement has thus far been scoring-based, which constrains our perspective of how firms develop their ESG strategies over time. The coronavirus pandemic has opened up a great opportunity for companies to shift to a conceptualization of real ESG (He and Harris, 2020), which at the same time highlights the weakness of standard ESG scoring measurements to capture this strategy's genuineness. Moreover, what is also needed is a more granular measurement of ESG that accounts for further characteristics of how this strategy is implemented and a decomposition of scores within pillars. Future research could delve into the array of patterns of sustainability at the pillar level and how firms may reallocate their ESG investments to respond to more specific areas within the same pillar. Each pillar of ESG is made up of a number of different items whose heterogeneity deserves more attention.

Another question for further investigation pertains to the antecedents of ESG that reinforce firm resilience, in particular those concerned with top managers' motivations (Sajko et al., 2021). For example, a CEO's environment (Cronqvist and Yu, 2017) and their cognitive and personal traits (Arena et al., 2018) affect their involvement in ESG and their degree of corporate risk-taking, which may in turn determine the extent to which they rely on this strategy to build firm resilience. Finally, a further limitation of our study stems from the cross-sectional analyses, since it is limited to the occurrence of one single shock. It may be enriching to explore how engagement in ESG might shape firm resilience over a longer time window, which incorporates several shocks of a different nature as well as a longer period to track the recovery of companies from each shock. It may be advisable to undertake multi-country studies so as to examine whether institutional factors might trigger divergences in the patterns of ESG strategy across companies.

Acknowledgements

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.lrp.2026.102618.

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[25] We appreciate this interesting nuance from an anonymous reviewer.

Data availability

The authors do not have permission to share data.

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