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On the Resilience of ESG Stocks during COVID-19: Global Evidence

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Abstract

Whether incorporation of environmental, social, and corporate governance (ESG) criteria affects the risk and return of investment portfolios is a much-debated question. Recent articles in the financial press, industry reports, and U.S. research suggest that the stocks of strong ESG firms may perform relatively well during crisis periods and thus serve as "rainy day assets" for investors. We test this hypothesis in a global setting by assessing the relation between ESG and stock price performance during the COVID-19 crisis. In a sample of more than 6,000 stocks in 45 countries, we find little evidence that firms with higher ESG ratings had better stock market performance in the first quarter of 2020. In a broader analysis over 2003-2020, we also do not find that stronger ESG stocks yield higher returns, either during crises or in crisis-free periods. The exception is North America, where stocks with higher ESG ratings have shown some degree of resilience during crises. Our findings indicate that the ability of socially responsible firms to deliver superior risk-adjusted stock market performance is still debatable and, at best, dependent on geography.

Samenvatting

Of de integratie van environmental, social & governance (ESG) criteria in beleggingsbeslissingen tot hogere voor risico gecorrigeerde rendementen leidt, is onderwerp van veel discussie. Theorie en empirisch bewijs bieden vooralsnog geen uitsluitsel. Recente artikelen in de financiële media, rapporten uit de financiële sector en onderzoek naar de Amerikaanse aandelenmarkt suggereren dat sterke ESG-bedrijven zouden kunnen gelden als "financieel appeltje voor de dorst" in de zin dat hun aandelen het relatief goed doen als het onrustig is op financiële markten. Wij testen deze hypothese door te onderzoeken of er wereldwijd een verband bestaat tussen de ESG-rating van bedrijven en hun prestaties op de aandelenmarkt tijdens de COVID-19-crisis. Uit onze analyse van meer dan 6.000 aandelen uit 45 landen komt weinig bewijs naar voren dat bedrijven met een hogere ESG-rating beter presteerden op de beurs in het eerste kwartaal van 2020. Ook in een bredere analyse over de periode 2003-2020 vinden we niet dat bedrijven met een hogere ESG-rating een beter rendement behaalden, binnen noch buiten crises. Een uitzondering is de Noord-Amerikaanse markt (Canada en de Verenigde Staten), waar bedrijven met een hogere ESG-rating het wel relatief goed deden op de aandelenmarkt gedurende crises. Onze resultaten geven aan dat het niet buiten kijf staat dat ondernemingen met een duurzamere, meer verantwoorde bedrijfsvoering werkelijk hogere voor risico gecorrigeerde aandelenrendementen behalen en laten zien dat dit in ieder geval afhangt van de geografische locatie.

1. Introduction

The year 2020 marked the 50th anniversary of the publication of an influential article by Milton Friedman (New York Times Magazine, 1970), in which he claimed that "the only responsibility of corporations is to make profits". Friedman's view became a reference point for the neoclassical economic paradigm that considered environmental, social, and governance (ESG) activities by firms as unnecessary and inconsistent with the ultimate corporate goal of profit maximization (Liang and Renneboog, 2020). In this line, several scholars argue that ESG activities should be regarded essentially as a manifestation of agency problems (Bernabou and Tirole, 2010; Masulis and Reza, 2015; Cheng, Hong, and Shue, 2016; Bebchuk and Tallarita, 2020), because managers who engage in ESG initiatives benefit themselves and promote their philanthropic reputation at the expense of shareholders (Krüger, 2015).

More recently, an alternative view of ESG has gained momentum. Notably, in 2019 the Business Roundtable declared that it was time to "move away from shareholder primacy" and to start leading firms for the benefit of *all* stakeholders – customers, employees, suppliers, communities, and shareholders. Hart and Zingales (2017) argue that firms should maximize shareholder welfare, not shareholder value – noting that shareholders may care about other (social, environmental) corporate objectives besides financial risk and return. At the same time, scholarly empirical evidence suggests that firms that engage in environmental protection, social equality, and community relations are relatively less affected by agency concerns (Ferrell, Liang, and Renneboog, 2016) and may help deliver on value-maximizing behaviors. In this perspective, ESG is viewed as a "win-win" situation for both a firm's shareholders and its stakeholders at large (Edmans, 2011; Deng, Kang, and Low, 2013; Albuquerque, Koskinen, and Zang, 2015).

The debate on the costs and benefits of ESG has important implications for investors. In fact, even if ESG and shareholder value go hand-in-hand, it is not obvious whether investors will benefit from investing in more socially responsible firms in the form of higher risk-adjusted returns. After all, if financial markets price the potential valuation effects of ESG in correctly, investors would only be able to obtain a fair return (given the associated level of risks) on their investments. The debate on whether ESG is associated with higher financial performance is far from settled. Friede, Busch, and Bassen (2015) summarize the findings of a large number of studies and report that a majority of these studies conclude that ESG and stock returns are positively related. On the other hand, Chava (2014) finds that stocks with better environmental performance exhibit lower expected returns. Similarly, Hong

and Kacperczyk (2009) highlight the superior stock market performance of "sin" stocks, and Bolton and Kacperczyk (2019, 2020) find greater average stock returns for stocks with a larger carbon footprint. Heinkel, Kraus, and Zechner (2001) and Pastor, Stambaugh, and Taylor (2019) argue that, from a theoretical standpoint, firms that engage more in ESG activities may have lower expected returns and thus a lower cost of equity capital.

In this paper, we examine whether there is a relation between ESG rating and the stock market performance of a global sample of firms during the COVID-19 crisis. We believe that this analysis is worthwhile and relevant for at least three reasons. First, an important concern about prior research on the relation between ESG and stock returns is the direction of causality. Do ESG activities add shareholder value, if at all, in a way not fully anticipated by the stock market, thereby leading to superior risk-adjusted stock returns? Or does financial performance allow firms to engage in expensive ESG activities? Following Albuquerque, Koskinen, Yang, and Zang (2020), we use the rise of the COVID-19 pandemic in the first quarter of 2020 as an exogenous shock to address the question whether stronger ESG firms (in an ex-ante sense; that is, based on their ratings before the pandemic) show better stock market performance during financial crisis periods.

Second, and related to this, a growing body of literature goes beyond the potential impact of ESG on stock returns by examining the relation of ESG to risk (Jo and Na, 2012; Kim, Li, and Li, 2014; Andersson, Bolton, and Samama, 2019). An important question is whether strong ESG firms do better during such a crisis period and can thus be viewed as "rainy day" assets, or as a hedge against adverse economic circumstances. Various financial media and industry reports have suggested that stronger ESG firms showed better stock market performance during the COVID-19 crisis (FD, 2020; IEXprofs.nl, 2020; AXA Investment Management, 2020). These articles argue that stronger ESG firms are better able to weather the crisis because they are more conscious about their supply chains, have better health and safety policies for their employees, are better governed and more transparent, and in general have better risk management systems in place.

Third, recent empirical studies show that financial markets are geographically segmented as far as responsible investment is concerned. Gibson, Rajna, and Glossner (2020) show that global institutional investors publicly committed to integrate sustainability in their investment decisions exhibit higher ESG portfolio-level ratings, with the notable exception of U.S.-domiciled institutions. Consistently, Dyck, Lins, Roth, and Wagner (2019) show that U.S.-headquartered investors do not appear to affect the sustainability footprint of the firms that they invest in. On the other hand,

European institutional investors, and especially those from countries whose culture strongly prizes sustainability, are able to eventually enhance the ESG ratings of the firms in their portfolios. The COVID-19 crisis provides an opportunity to test whether responsible investment policies that assign more weight to ESG stocks fared relatively well for institutional investors across regions. Such a global test also provides important out-of-sample evidence on the resilience of ESG stocks during crises, based on the U.S. stock market.

Because of its unexpected and dramatic impact, the COVID-19 pandemic represents an exogenous shock that allows researchers to shed light on the corporate characteristics that promoted financial resilience during crises. The early evidence suggests that access to liquidity, higher cash holdings, and lower financial leverage positively affected the resilience of stock prices at the height of the COVID-19 crisis (Acharya and Steffen, 2020; Fahlenbrach, Rageth, and Stulz, 2020; Ramelli and Wagner, 2020). Proactive measures to protect the workforce and supply chains in their ability to implement social distancing on workplaces have also positively contributed to the stock price performance of firms during the COVID-19 shock (Cheema-Fox, LaPerla, Serafeim, and Wang, 2020; Pagano, Wagner, and Zechner, 2020).

Prior studies use other periods of financial market turmoil to study the causal impact of ESG performance on stock market performance. For instance, Lins, Servaes, and Tamayo (2017) show that, during the 2008-2009 financial crisis, stock returns for firms more active in ESG were significantly higher than those of firms that engaged less in ESG initiatives. Albuquerque et al. (2020) find that U.S. firms with higher ESG ratings recorded higher stock returns during the COVID-19 crisis. These contributions consider three main channels through which ESG ratings may relate to stock market performance during crises. First, ESG can be considered as a product differentiating strategy (Albuquerque, Koskinen, and Zhang, 2019; Gantchev, Giannetti, and Li, 2019), and such ESG-related differentiation enhances customer loyalty, thus reducing the stock sensitivity to general shocks. Second, firms with higher ESG ratings are, by definition, more likely to be included in the portfolios of socially-responsible investors. Such investors tend to be more resilient to shocks (Heinkel, Kraus, and Zechner, 2001; Renneboog, Ter Horst, and Zhang, 2011; Ferriani and Natoli, 2020), thereby making firms with higher ESG ratings less likely to be affected by sell-offs. Third, firms that consistently engage in ESG promote civic engagements and collaboration with all stakeholders, thus enhancing their social capital endowment (Lins et al., 2017). The high level of trust and social capital may allow ESG champions to weather unexpected shocks relatively better.

However, the empirical work that establishes a relation between corporate sustainability and firm value has primarily focused on U.S. firms (Lins et al., 2017; Albuquerque et al., 2020). The extent to which ESG activities can contribute to the financial performance and resilience of firms outside the U.S. is still virtually unexplored. We address this gap by investigating the degree of resilience provided by ESG performance for a global sample of firms. For this purpose, we obtained detailed data on ESG ratings for a global sample of firms from Thomson Reuters' Refinitiv ESG database. Following Albuquerque et al. (2020), our main analyses omit the governance rating (G) and focus on the environmental and social (ES) rating. Albuquerque et al. (2020) argue that the superior stock market performance of U.S. firms during the COVID-19 crisis stems from their greater customer and investor loyalty, which are arguably more likely to be based on the E and S than the G rating. That said, the financial media and industry reports suggesting outperformance of ESG stocks during the COVID-19 crisis also allude to their governance. For that reason, we also present results based on the overall ESG rating as well as on the separate E, S, and G sub-ratings. We collect data on stock returns and financial statement information from Datastream and Worldscope, respectively. Our final sample contains 6,824 firms from 45 countries.

We show that, without considering any control variables, the firm-level ES rating is positively associated with (abnormal) stock returns during the COVID-19 crisis in the first quarter of 2020. However, once we control for country-wide effects, this result disappears. In other words, stronger ES firms did not show better stock returns because of their ES rating per se, but because they tend to be domiciled in countries whose stocks in general showed a relatively better (abnormal) stock return. Such country-wide effects may be due to a host of reasons why some countries performed better than others (including susceptibility and/or response to the COVID-19 pandemic) and can thus not be reliably attributed to the ES activities of individual firms. When we rerun our baseline analyses for North America (Canada and the U.S.), we confirm the finding by Albuquerque et al. (2020) that stronger ES stocks in this region did show superior stock market performance, even after controlling for country-wide effects and a broader set of control variables than in their study – although the statistical significance of this effect is rather weak. However, for all other regions (Europe, Japan, Asia-Pacific, and Emerging Countries), the effect of ES on (abnormal) stock returns in 2020:Q1 is economically small (sometimes even negative) and statistically insignificant. When we zoom in on a number of ESG sub-ratings that are potentially more directly related to the resilience of different firms during the COVID-19 pandemic, we find that the S sub-rating for "Workforce" shows the strongest positive relation with (abnormal) stock returns, but only in North America. This finding

suggests that the better working conditions of stronger ESG firms are a primary driver of the better performance of stronger ESG stocks during the COVID-19 crisis in that region, but not in other regions.

To analyze the relation between ESG, stock returns, and crises more generally, we also estimate panel models of the returns on our global sample of stocks over the period 2003-2020 on their ES rating, as well as the interaction between the ES rating and a dummy variable that indicates global financial crises (as indicated by the 10% of months with the worst return on the MSCI Global index). In our baseline analyses, we find no evidence that ES ratings are significantly related to stock returns, either during crises or in crisis-free periods. We obtain similar results when using the ESG rating. When including the E, S, and G sub-ratings separately, we find some evidence that firms with a greater S rating outperform their peers in the stock market during global financial crises, although the statistical and economic significance of this effect is modest. When breaking this analysis down by geographical region, we again find that North America is the only region in which stocks with a higher ES rating have shown greater resilience during crisis periods.

Taken together, our findings cast doubts on the view that better ESG is associated with enhanced resilience to significant economic shocks in a global setting. In particular, such a relation does not appear to hold for firms outside of North America, leading to a mixed and geography-dependent financial argument in favor of stakeholder versus shareholder value maximization from the perspective of investors. Cultural and institutional elements can weigh in the asymmetric role played by ESG ratings in the degree of resilience to the COVID-19 shock. Further empirical work should shed light on the heterogeneous response to the pandemic of socially responsible firms around the world.

We are able to dispel the view of Heinkel et al. (2001) and Renneboog et al. (2011) that, because high-ESG firms attract socially responsible investors and are assumed to be more resilient and less volatile, those firms are also the ones poised to weather well any exogenous shocks on the stock market. Firms with higher ESG ratings have been more resilient in the U.S, where investors are generally less committed to responsible investment strategies (Gibson et al., 2020). At the same time, European firms with higher ESG ratings have not recorded a rosier financial performance during the pandemic despite the fact that European investors are regarded as the champions of socially responsible investment (Dyck et al., 2019).

The remainder of the paper is structured as follows. Section 2 describes the data and sample construction. Section 3 discusses the methodology. Section 4 presents the results. Section 5 concludes and points out the limitations of our findings and future avenues of research.

2. Data and Sample Construction

We obtain measures of corporate ESG performance from Thomson Reuters' Refinitiv ESG database. This dataset is frequently used in the sustainable finance literature (see, e.g., Dyck et al., 2019; Albuquerque et al., 2020). Refinitiv analysts collect data from publicly available sources such as corporate reports, nongovernmental organizations, sustainability reports, and stock exchange filings. Data coverage starts in 2002 and is updated on a yearly basis. As of 2020, the database includes over 9,000 publicly listed firms worldwide.

Refinitiv assesses ESG performance using the so-called E, S, and G pillars, which break down into ten categories that segregate into 25 themes. The E pillar contains three categories: (1) Emission, (2) Innovation, and (3) Resource Use. The S pillar holds four categories: (1) Community, (2) Human Rights, (3) Product Responsibility, and (4) Workforce. The G pillar includes: (1) Corporate Social Responsibility (CSR) Strategy, (2) Management, and (3) Shareholders. Further down the hierarchy within Workforce, we find four themes that are of particular interest for our study, since they are related to working conditions that could potentially contribute to our understanding of the differential stock market performance of firms during the COVID-19 crisis. These four themes are (1) Diversity and Opportunity, (2) Training and Development, (3) Employment Quality, and (4) Health and Safety.

Refinitiv evaluates ESG in a bottom-up approach, which starts with the assessment of the firms' ESG category performance (see Appendix A). Note that Refinitiv does not provide the ESG performance within the above-mentioned ESG themes (e.g., Employment Quality). These theme classifications are only required for the construction of a category materiality matrix, which is then needed to aggregate category ratings into pillar ratings (as will be outlined in the next paragraph). To calculate ES (G) category ratings, Refinitiv ranks industry (country) peers by their overall performance across a category-specific set of ES (G) metrics and subsequently derives a percentile rating for each firm (see Appendix A). Thus, the ESG category ratings reflect a firm's relative ESG performance compared to its industry peers (for E and S ratings) and its country peers (for G ratings). We note that these "relative" ESG ratings may be perceived as unfitting in the sense that, for example, firms in an industry that is more "polluting" in an absolute sense (such as the airline industry) may have a higher E ratings than firms in a "sustainable" industry (such as a recycling firm). However, from the perspective of proper identification of the effect of ESG ratings on stock market performance, it is imperative to control for such industry (and country) effects, since otherwise it is impossible to ascertain that any detected relation between ESG

ratings and stock returns is really due to the ESG performance itself, as opposed to some unobservable industry or country characteristic. We will return to this issue in more detail below.

To calculate ESG pillar ratings, Refinitiv first assigns *weights* to the underlying category ratings, which reflect the industry/country-specific materiality[1] of each category. Pillar ratings are subsequently calculated as the *weighted* aggregate of the subsidiary ESG category ratings. We include all firms in the Refinitiv database for which we extract the ESG pillar ratings and category ratings. In line with Albuquerque et al. (2020), we drop the G pillar rating and calculate our primary ESG measure as the average of the E and S pillar ratings (*ES*). We examine other ESG measures, including the overall ESG rating, calculated as the average of the E, S, and G pillar ratings and more specific ESG sub-ratings, such as the category ratings for *Community*, *Human Rights*, and *Workforce* theme ratings within the latter category. Since Refinitiv does not provide ESG theme ratings, we manually construct *theme* ratings using Refinitiv's *category* rating approach.[2] First, we obtain all thirty Workforce-related metrics (see Appendix A). Next, we allocate each metric to its related theme, which is indicated by the third and fourth string in the metrics' ID. For example, metric S0**HS**DP004 reports whether "the firm has an employee health and safety team" and therefore is assigned to the Health and Safety theme. Similarly, metric S0**TD**DP018 reports the "average hours of training per year per employee" and is therefore allocated to the Training and Development theme.

Next, we apply a Refinitiv materiality scheme (which outlines ESG materiality by TRBC industry group[3]) to classify each metric as material or immaterial to a particular industry. We rank TRBC industry peers on all thirty metrics separately and convert the rankings into percentile ratings. To calculate a theme rating, we select all *material*

1 The Sustainable Accounting Standards Board defines material ESG factors as "reasonably likely to impact the financial condition or operating performance of a firm and therefore are most important to investors."

2 Refinitiv. April 2020. 'Environmental, Social and Governance (ESG) ratings from Refinitiv'. Downloaded from: *https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/esg-ratings-methodology.pdf*

3 See *https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/trbc-business-classifcation-methodology.pdf*. We obtained the Refinitiv materiality scheme from Refinitiv via email; we are not aware of any public source for this scheme.

theme-specific percentile ratings, take their simple average[4], and rank the industry peers accordingly. Again, we translate the rankings into percentile ratings, which now make up the desired theme ratings.

In our main analyses, we assess the effect of ESG on stock returns during the COVID-19 stock market crisis (2020:Q1) in the cross-section. Subsequently, we use panel data between 2003 and 2020 to investigate whether ESG stocks serve as a "rainy day asset" in periods of market turmoil more generally. In our COVID-19 analysis, we use abnormal stock returns as our main measure of the stock market performance of firms To calculate abnormal stock returns, we apply a domestic market model (Griffin, 2002) and regress monthly arithmetic stock returns on a constant and the domestic market factor, where the latter equals the monthly arithmetic return of the local benchmark. We turn to Thomson Reuters' Datastream and retrieve the monthly stock Return Index (RI) and Local Market Index (LI) from 2015 to 2020:Q1. RI, which we use to calculate raw stock returns, reflects the value of an equity investment, assuming that all dividends are re-invested at the closing price on the ex-dividend date. LI is the price index of the stock's local benchmark. Both variables are expressed in US$. To estimate the equity betas, we adhere to common practice (e.g., Lins et al., 2017) and maintain a 60-month beta estimation period running up to the COVID-19 outbreak (i.e., from 2015 to the end of 2019). We include firms with a minimum of 36 monthly returns in our estimation window to preserve the quality of our beta estimates. Next, we calculate quarterly abnormal stock returns in 2020:Q1[5] as the stock's arithmetic quarterly return in 2020:Q1 minus the estimated equity beta times the arithmetic return of the local benchmark in 2020:Q1. To reduce the impact of potential outliers, we winsorize the estimated betas as well as the 2020:Q1 abnormal returns at the 1st and 99th percentiles.

An important pitfall of the use of abnormal returns is the underlying assumption that a stock's market beta remained constant between the estimation window and the period of interest (in our case, 2020:Q1). As argued by Ramelli and Wagner (2020), this assumption might be audacious since, in response to the COVID-19 outbreak, investors largely changed their view on the susceptibility of firms to market risk. Using a sample of Russell 3,000 constituents, Ramelli and Wagner show a 17% correlation

4 By taking the simple average (sum of percentile ratings / number of non-missing percentile ratings), we deviate from Refinitiv's approach, which prescribed taking the total sum of percentile ratings. We do this because we constructed two Workforce category ratings: (1) based on averaging percentile ratings and (2) based on adding up percentile ratings. We compared this to the Workforce rating that is available in Datastream. We found that the Workforce category rating based on the simple average best fitted the Workforce rating in Datastream.

5 We calculate the 2020:Q1 returns from January 1, 2020 until April 1, 2020.

between beta estimates based on daily returns over 2020:Q1 and beta estimates based on daily returns over 2019, while they report an average 2019 inter-quarter beta correlation of 51%. This indicates that beta estimates based on pre-2020 stock returns are a rather crude indicator of the true exposure of firms to market risk from 2020 onwards. Hence, in a robustness check we repeat our analysis based on raw returns.

To control for the impact of the financial condition of firms on stock returns, we obtain accounting data for the year 2018 (expressed in US$) from the Worldscope database via Thomson Reuters' Datastream. We follow Albuquerque et al. (2020) in our selection and calculation of *Tobin's Q*, firm *size* (natural log of market capitalization), *cash ratio*, *leverage*, and return on equity (*ROE*) for our first set of financial controls. Demers, Hendrikse, Joos, and Lev (2020) determine that the findings of Albuquerque et al. (2020) disappear when including a broader set of control variables. We thus expand our first set of control variables by including a limited number of additional controls from Demers et al. (2020). These include return on assets (*ROA*); a loss-indicating dummy and industry-adjusted *inventory turnover* as measures of accounting performance; research and development, and selling, general and administrative (*R&D & SGA*) expenses as a measure of internally developed intangibles; a book-to-market ratio (*BTM*); a dummy to indicate a *negative BTM*; stock price *momentum* and *idiosyncratic risk* to capture growth opportunities and risks; and finally, *market share* and *dividend payout*. All continuous control variables are winsorized at 1st and 99th percentile. Note that we do not include all other controls of Demers et al. (2020) because not all databases were available to us, but also because adding these further controls reduce the sample size for the U.S. by almost one third, and likely by even more for our global sample. After merging the datasets, we drop all countries that are represented by fewer than ten firms in our sample. We further exclude all firms for which the local benchmark is dead or inactive. Our final cross-sectional sample contains 6,824 firms from 45 countries.

For our broader analysis of the relation between ESG ratings, stock returns, and financial crises, we collect panel data between 2003 and 2020 through the previously mentioned databases. Our main measure of stock market performance is the monthly raw return, which we derive from RI. In these panel analyses, we include the following control variables from Bolton and Kacperczyck (2019): *EPS growth*, *sales growth* (we adjust this to asset growth), and a 12-month rolling *beta*. From Bolton and Kacperczyck (2020) we also draw the stock price *reversal* effect, stock price *volatility*, and stock price *momentum*. We furthermore add all controls from our cross-sectional regression model (except for *momentum* and *idiosyncratic risk*, since these effects are proxied by the alternative *momentum* and *volatility* variables that we adopted from

Bolton and Kacperczyck (2020)). We winsorize our dependent variable and all continuous control variables at the 1st and 99th percentiles in the cross-section. We drop all countries that were absent in our cross-sectional sample. Our final sample consists of 7,559 unique firms and 556,410 firm-months. Appendix B provides a detailed description of all variables included in the cross-sectional and panel regressions.

3. Methods

We analyze the impact of ESG on stock returns during the COVID-19 stock market crisis in 2020:Q1 using a cross-sectional ordinary least squares regression model, following previous literature (Lins et al., 2017; Albuquerque et al., 2020). Our cross-sectional model can be expressed as follows:

$$Return_i = b_0 + b_1 ESG_i + b_2 Controls_i + \Lambda + \varepsilon_i, \tag{1}$$

where $Return_i$ is our main measure of return for firm i (the *abnormal* return of its stock over 2020:Q1 or AR_{Q1}); $Controls_i$ represent a set of variables that measure the financial condition of firm i; ESG_i represents a measure of ESG performance for firm i. We follow the standards in the asset pricing literature in lagging the ESG and control variables to make sure that they are observable before we measure the stock market performance in 2020:Q1. For stock market based variables such as *Size* (market cap), we use data from the end of 2019 since these data are immediately available to investors. For accounting variables such as *Leverage*, we use data from 2018 since the values of these variables over 2019 are not known to investors by 2020:Q1. For the ESG rating, we follow Albuquerque et al. (2020) and also use the values for 2018, since these ratings are published with a considerable delay and hence the 2019 rating was not known by 2020:Q1.

The variable Λ represents industry and country dummies (fixed effects). Including these fixed effects is important since, if any relation between ESG and (abnormal) stock returns is purely driven by industry or country effects, it is impossible to determine whether it is ESG itself that can explain why some firms perform better than others or the industry or country they belong to. We adopt 2-digit SIC code industry classifications in our industry-fixed effects, in line with related studies (Lins et al., 2017; Demers et al., 2020; Ding et al., 2020). To compare the effect of ESG across different regions worldwide, we split our sample in five different regions (Europe, Japan, Asia-Pacific, North America, and Emerging Countries) according to a geographic classification scheme provided on Ken French's website.[6] Appendix C summarizes the sample distribution by industry and region. In addition, we conduct analyses that include more specific measures of ESG, including the category ratings for *Community*, *Human Rights*, and *Workforce* and the latter's subsidiary theme ratings. Appendices D and E show large differences in the AR_{Q1} of, respectively, the countries and industries

6 Obtained from Ken French's data library at *http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html*.

in our sample that may or may not have been partly driven by differences in ESG ratings.

We assess the robustness of our baseline results by several means. First, we re-estimate our baseline model using *log-based* abnormal returns, *log-based* stock momentum, and *log-based* idiosyncratic risk, thereby replacing their *arithmetic-based* variants. Second, we exchange AR_{Q1} with *raw returns* over 2020:Q1 (RR_{Q1}). Third, we acknowledge that AR_{Q1} captures investors' reaction to the spread of COVID-19 as well as the subsequent introduction of fiscal policies in many countries around the world through March 2020. To exclude the impact of U.S. policies on stock returns in particular, we investigate the impact of *ES* on the *raw return* over the so-called "fever period" (RR_{fever}); this showed the greatest stock price movements as a result of COVID-19, as defined in the U.S. study by Ramelli and Wagner (2020). This period stretches from February 24, which was the first trading day after Italy went into a lockdown, to at least March 6, when the first of a series of Coronavirus Emergency Aid Packages was introduced in the U.S. (Albuquerque et al., 2020), but it possibly extends to March 23, when the Federal Reserve (FED) strongly intervened in the corporate bond markets (Ramelli and Wagner, 2020). We match Albuquerque et al. (2020) and set the fever period to the period from February 24 to March 18, when the second Coronavirus Emergency Aid Package was announced in the U.S. and the FED started to relieve the short-term debt markets via the Commercial Paper Funding Facility (Albuquerque et al., 2020). As our fourth robustness test, we replace the 2-digit SIC industry classification by Thomson Reuters' TRBC industry classification in our industry-fixed effects.

In our broader analysis of the relation between ESG and stock returns during and outside of crisis periods over 2003-2020, we estimate the following fixed effects panel regression model:

$$Return_{i,t} = c_0 + c_1 ESG_{i,t} + c_2 Crisis_t + c_3(ESG_{i,t} * Crisis_t) + c_4 Controls_{i,t} + \Lambda + \eta_{i,t}, \quad (2)$$

where $Return_{i,t}$ represents our main measure of return for firm *i* (the raw monthly total return of its stock (including dividends) in month *t* (RR_{month}); $ESG_{i,t}$ is a measure of ESG performance of firm i known by month t; $Crisis_t$ is a dummy variable set to one if the MSCI World Index return over month t is among the worst 10% monthly returns between January 2003 and August 2020, and zero otherwise; $ESG_{i,t} * Crisis_t$ is the interaction term to assess the impact of *ESG* on stock returns in times of crisis; $Controls_{i,t}$ represent a set of lagged accounting-based and market-based control variables for firm i known by month t. We again follow the standard in the literature by using stock market-based variables such as *Size* (market cap) from month t-1,

since they can be observed immediately. For accounting variables such as *Leverage*, we assume that they are known by investors by July of the following year, so that we match, for example, stock returns from January to June 2019 to *Leverage* in 2017 and returns from July to December 2019 to *Leverage* in 2018. For the ESG rating, we account for a longer reporting delay by matching stock returns during the period from January to December 2019 to the ESG rating in 2017.

The variable Λ represents a combination of fixed effects, which we will vary by model specification. In our baseline panel model specification, we include both industry-month and country-month fixed effects to make sure that any relation between ESG and stock returns that we find is not simply driven by pure industry or country effects. This specification is similar to running Fama-Macbeth (1973) cross-sectional regressions with industry and country dummies. In line with our cross-sectional analysis, we adopt 2-digit SIC code industry classifications for our industry-fixed effects. Similarly, we split our sample into the same five regions (Europe, Japan, Asia-Pacific, North America, and Emerging Countries).

4. Results

In this section, we present summary statistics for all variables included in our cross-sectional analysis (Section 4.1), our global cross-sectional regression results for the COVID-19 crisis in 2020:Q1 (Section 4.2), the results of our cross-sectional regressions estimated by region (Section 4.3), our robustness tests of the cross-sectional regression results (Section 4.4), more specific analyses of ESG sub-ratings instead of the broad *ES* rating (Section 4.5), and the results of our panel analyses of the more general relation between ESG ratings, stock returns, and financial crisis over 2003-2020 (Section 4.6).

4.1 Cross-sectional summary statistics

Table 1 presents summary statistics for all variables in our cross-sectional analysis. The number of observations is capped at the number of observations for *ES*, in the sense that we only report summary statistics for the various variables included in our cross-sectional analysis for firms for which we also have an ES rating. The RR_{Q1} mean statistic in the top row shows that the average raw return across our global sample was -32% over 2020:Q1, and the mean AR_{Q1} was close to -5%, indicating that the firms in our sample performed poorly and even underperformed versus their local market benchmarks considering the firms' historical beta. The firms in our sample held on average 17% of their assets in cash, maintained an average leverage ratio of 25%, and 17% of the firms in our sample was not profitable (as defined by a negative *ROA*). Data on most variables are available for more than 6,000 firms globally.

4.2 Cross-sectional regressions results on the performance of ESG stocks during COVID-19

Before turning to our cross-sectional regression results, we first present (in Figures 1 and 2 for our global and North American samples, respectively) a graph of the performance (cumulative raw stock returns over 2020:Q1) of the global top and bottom ES stocks, respectively, defined by stocks in the top and bottom 20% of their 2018 ES rating. These initial, crude graphical representations show little difference between the performance of the top and bottom 20% of global *ES* stocks (Figure 1). The top 20% *ES* stocks did seem to outperform the bottom *ES* stocks by a few percentage points over 2020:Q1 in North America (Figure 2), although unreported tests show that the difference in cumulative returns across the two portfolios was not statistically significant. We obtain similar graphs when we use the ESG instead of the ES rating.

Table 1: Summary statistics for the cross-sectional analysis over 2020:Q1

This table shows summary statistics for the full sample (N=6,824). The number of observations for all variables is capped at the number of observations for *ES*. The abnormal returns and all continuous controls are winsorized at the 1st and 99th percentile in the cross-section. Appendix B provides a detailed variable description. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database.

	Count	Mean	SD	Min	p25	Median	p75	Max
AR_{Q1}	6,824	-5.065	20.539	-57.097	-17.775	-5.035	6.945	53.281
AR_{fever}	6,824	-3.683	19.821	-56.092	-15.739	-3.289	7.641	52.361
RR_{Q1}	6,824	-32.284	25.214	-100.000	-45.892	-32.154	-18.620	841.021
RR_{fever}	6,824	-35.528	20.186	-100.000	-48.111	-35.453	-22.409	400.000
ESG	6,824	0.420	0.206	0.001	0.253	0.393	0.578	0.943
ES	6,824	0.386	0.243	0.001	0.176	0.343	0.580	0.969
E	6,824	0.322	0.289	0.000	0.031	0.267	0.564	0.987
S	6,824	0.450	0.233	0.002	0.264	0.429	0.630	0.978
G	6,824	0.487	0.225	0.002	0.308	0.494	0.669	0.982
Community	6,027	0.505	0.288	0.002	0.262	0.488	0.735	0.999
Human Rights	6,026	0.515	0.271	0.031	0.272	0.449	0.754	0.998
Workforce	6,027	0.520	0.286	0.002	0.276	0.527	0.769	0.999
Health and Safety	6,398	0.527	0.275	0.024	0.253	0.531	0.771	0.999
Training and Development	6,398	0.525	0.274	0.052	0.276	0.505	0.766	0.999
Employment Quality	5,891	0.496	0.288	0.001	0.245	0.500	0.745	0.999
Diversity and Inclusion	6,455	0.529	0.275	0.031	0.320	0.527	0.770	0.999
Custom Theme	6,398	0.527	0.274	0.024	0.259	0.531	0.764	0.999
Tobin's Q	6,653	2.092	2.113	0.563	1.027	1.312	2.179	13.749
Size	6,657	7.944	1.596	3.637	6.858	7.951	8.995	11.862
Leverage	6,819	25.466	20.029	0.000	8.586	23.233	38.115	86.148
Cash Ratio	6,129	16.847	19.206	0.169	4.148	10.144	21.376	92.400
ROE	6,814	7.484	35.799	-201.085	4.002	10.020	16.716	148.886
ROA	6,819	2.900	11.503	-58.332	0.917	3.501	7.477	29.627
Loss (dummy)	6,824	0.166	0.372	0.000	0.000	0.000	0.000	1.000
R&D & SGA	6,690	19.081	27.404	0.000	1.382	8.996	25.304	156.823
Inventory turnover	6,824	58.913	93.385	0.000	0.000	31.040	79.298	609.833
BTM	6,653	0.710	0.736	-0.230	0.251	0.513	0.906	4.513
Negative BTM (dummy)	6,824	0.024	0.152	0.000	0.000	0.000	0.000	1.000
Momentum	6,824	22.430	40.021	-72.526	-0.642	20.038	41.011	179.874
Idiosyncratic risk	6,824	8.912	5.029	2.947	5.516	7.428	10.705	29.861
Market share	6,819	0.071	0.166	0.000	0.003	0.014	0.051	1.082
Dividend payout	6,808	41.407	81.724	-228.321	0.000	27.815	57.869	530.830

Figure 1: Performance of top and bottom global ES stocks during COVID-19
This figure shows top 20% vs. bottom 20% *ES* global portfolio cumulative market-weighted returns over 2020:Q1.

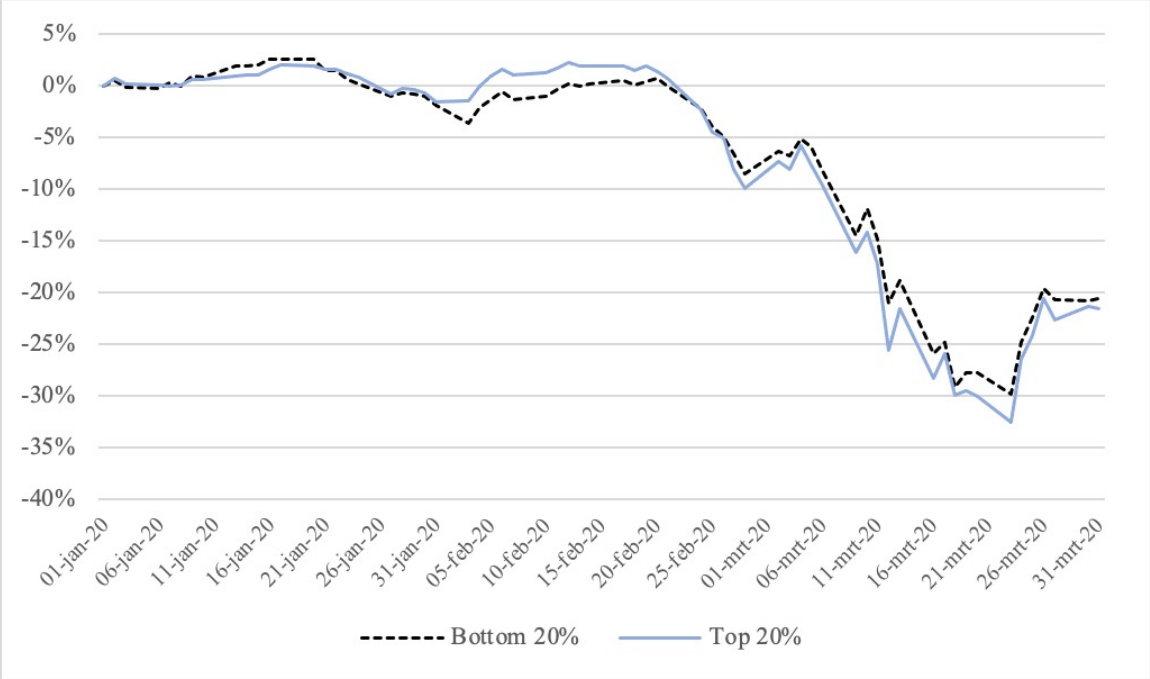

Figure 2: Performance of top and bottom North American ES stocks during COVID-19
This figure shows top 20% vs. bottom 20% *ES* North American portfolio cumulative market-weighted returns over 2020:Q1.

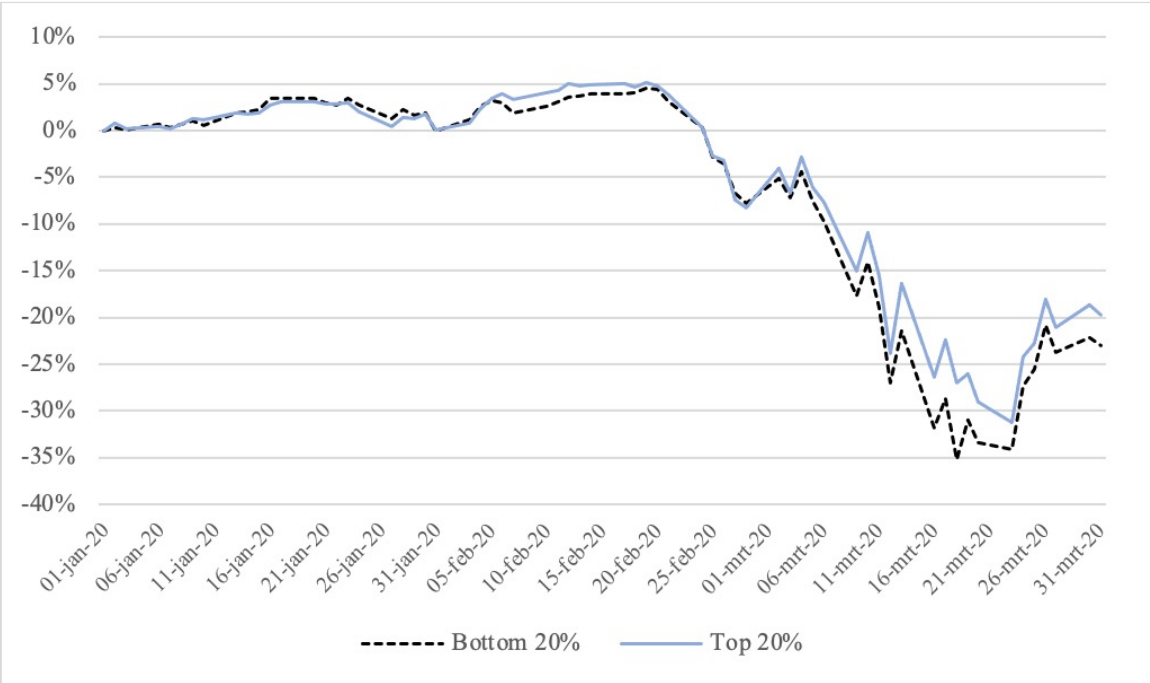

Table 2: Cross-sectional regressions of stock returns during COVID-19 on ES rating
This table presents regression results of abnormal returns over 2020:Q1 (AR_{Q1}) on the ESG performance of firms, measured as the average of Refinitiv's Environmental and Social pillar rating (*ES*) and various controls, across the global sample (N=6,824). We use 2-digit SIC codes industry classification in the industry-fixed effects. Market and accounting data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database. AR_{Q1} and all continuous controls are winsorized at the 1st and 99th percentile. Appendix B provides a detailed variable description. All models include heteroscedasticity robust standard errors. Intercepts are suppressed to conserve space. Parentheses contain *t*-statistics.
* *p*<0.1, ** *p*<0.05, *** *p*<0.01.

	(1)	(2)	(3)	(4)	(5)	(6) – baseline
Dependent variable:	AR_{Q1}	AR_{Q1}	AR_{Q1}	AR_{Q1}	AR_{Q1}	AR_{Q1}
ES	4.441***	4.099***	1.129	0.859	-0.859	-0.775
	(4.55)	(4.35)	(1.08)	(0.86)	(-0.65)	(-0.59)
Tobin's Q					1.321***	0.841***
					(8.51)	(4.82)
Size					1.541***	2.071***
					(6.69)	(7.46)
Leverage					-0.0612***	-0.0749***
					(-3.94)	(-4.70)
Cash ratio					0.110***	0.0809***
					(6.18)	(4.27)
ROE					-0.0134	-0.00499
					(-1.49)	(-0.47)
ROA						0.0371
						(0.83)
Loss (dummy)						0.435
						(0.38)
R&D & SGA						0.0314**
						(2.00)
Inventory turnover						-0.00250
						(-0.89)
BTM						1.297**
						(2.34)
Negative BTM (dummy)						2.164
						(0.97)
Momentum						0.0704***
						(8.29)
Idiosyncratic risk						0.480***
						(5.26)
Market share						1.673
						(0.98)
Dividend payout						-0.000848
						(-0.26)
N	6,824	6,824	6,824	6,824	5,972	5,965
Adj. R^2	0.003	0.123	0.040	0.163	0.225	0.247
Industry FE	No	Yes	No	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes	Yes

Next, we discuss the results of our cross-sectional regressions of quarterly abnormal stock returns in 2020:Q1 (AR_{Q1}) on the stock-level *ES* rating and a varying set of control variables in Eq. (1). Table 2 shows estimation results of six different regression models for the global sample. Model (1) in Table 2 estimates the effect of *ES* on AR_{Q1} without any controls or fixed effects. We extend the first model and introduce industry-fixed effects in model (2) and substitute these for country-fixed effects in model (3). In model (4) we include both industry- and country-fixed effects. We add controls from Albuquerque et al. (2020) in model (5). In our baseline model (6), we furthermore include additional control variables from Demers et al. (2020). We use heteroscedasticity robust standard errors in all models.

Model (1) in Table 2 suggests that global stocks with higher ES ratings did achieve higher abnormal returns over 2020:Q1. The coefficient on our key *ES* variable is 4.441, which indicates that a one standard deviation (SD) gain in *ES* (0.243; from Table 1) was associated with a 1.08% higher AR_{Q1} (0.243*4.441) on average. This effect is statistically significant at the 1% level (*t*-stat = 4.55), is economically meaningful (although also not huge in light of the large overall stock market decline in 2020:Q1), and persists after the introduction of industry-fixed effects in model (2). The subsequent inclusion of country-fixed effects in model (3), however, diminishes the economic magnitude of this effect by almost three quarters to 1.129 (or only a 0.27% change in abnormal returns associated with a one SD change in the *ES* rating) and renders it statistically insignificant (*t*-stat = 1.08). The inclusion of both country- and industry-fixed effects in model (4) weakens the economic impact and statistical significance of *ES* slightly further. As we gradually add control variables in model (5) and our "baseline" model (6), the coefficient on *ES* actually turns negative – although still not statistically significant.

Of course, average ESG ratings may well differ across countries, and country-fixed effects also absorb such average differences in ESG ratings across countries and are in that sense rather crude. That being said, it seems perilous to attribute any significant effect of the ES rating on a firm's stock market performance in the absence of a country-fixed effect to a true effect stemming from the differential ESG performance of firms. After all, countries differ along many, sometimes unobservable dimensions that could influence their stock market performance during 2020:Q1, including susceptibility to COVID-19 as well as medical and economic policy responses to the crises. Since it is virtually impossible to control for all of these country-level characteristics, the inclusion of country-fixed effects is simply a conservative way to assess the relation between ESG and stock market performance, which our results in Table 2 suggest is not driven by firm-specific ESG performance. We thus infer from Table 2 that, from a

global perspective, stocks of firms with higher ES ratings did on average outperform their peers during the COVID-19 pandemic-induced market turmoil, but mainly due to the fact that these firms tend to be located in countries whose stock market performed relatively well in 2020:Q1.[7] All in all, we conclude that the evidence in support of the hypothesis that firms with higher ESG ratings showed better stock market performance during the COVID-19 crisis for our global sample is weak.

Regarding the results on the control variables in Table 2, we observe that stocks of financially stronger firms (i.e., firms with lower leverage and more cash) showed higher abnormal returns, which aligns with previous studies in the sustainable finance literature on stock reactions to exogenous shocks (Lins et al., 2017; Albuquerque et al., 2020; Demers et al., 2020; Ding et al., 2020; Ramelli and Wagner, 2020). For example, according to our baseline model, a one SD decrease in leverage (20.03) and cash ratio (19.21) was associated with, respectively, a 1.50% and 1.55% higher AR_{Q1}. Consistent with the U.S. results of Albuquerque et al. (2020), we find that firm *size* has a positive effect on AR_{Q1}, indicating that large firms showed better stock returns during 2020:Q1. As a robustness check, we reassess our baseline findings when excluding the dominant U.S. stocks Facebook, Apple, Amazon, Netflix, and Google, as well as Microsoft and Tesla (FAANGMT), from our global sample and obtain similar results (*ES* coefficient = 0.690 with a *t*-stat of -0.52; not tabulated).

4.3 Regional differences in the performance of ESG stocks during COVID-19

In this subsection, we shed more light on the relation between *ES* and AR_{Q1} in various regions to examine whether ESG stocks do serve as "rainy day" assets in specific regions around the world. We adopt the classification scheme (largely geographic) from Ken French's website and estimate our baseline model for the following regions: Europe, Asia-Pacific, Japan, North America, and Emerging Countries.

Table 3 shows the results. For purposes of comparison, we include the baseline regression results for the global sample (from Table 2) in the first column. It is clear from Table 3 that the relation between 2020:Q1 stock returns and *ES* differs markedly across the different regions around the world. The coefficient on *ES* is negative in two of the five regions and positive in three regions. The only significant coefficient on ES is observed for North America, for which the coefficient estimate of 4.198 is significant

7 These findings deviate from Ding, Levine, Lin, and Xie (2020), who examine raw stock returns during the corona crash and conclude that, across a global sample, stocks of higher ESG-rated firms achieved higher weekly returns. It is not clear what drives the differences in results; candidate explanations include using abnormal instead of raw returns in our baseline regression analysis, differences in the data frequency, and differences in the control variables.

Table 3: Cross-sectional regressions of stock returns during COVID-19 on ES rating by region

This table presents baseline regression (see Table 2) results of abnormal returns over 2020:Q1 (AR_{Q1}) on ESG performance, measured as the average of Refinitiv's Environmental and Social pillar ratings (*ES*) and various controls across different regions. Geographical classification is derived from Ken French's website. We use 2-digit SIC codes industry classification in the industry-fixed effects. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database. AR_{Q1} and all continuous controls are winsorized at the 1st and 99th percentile. Appendix B provides a detailed variable description. Appendix C presents a sample distribution by region. All models include heteroscedasticity robust standard errors. Intercepts are suppressed to conserve space. Parentheses contain *t*-statistics.
* *p*<0.1, ** *p*<0.05, *** *p*<0.01.

	Global	Europe	Japan	Asia-Pacific	North America	Emerging Countries
Dependent variable:	AR_{Q1}	AR_{Q1}	AR_{Q1}	AR_{Q1}	AR_{Q1}	AR_{Q1}
ES	-0.775	-3.842	2.542	-2.923	4.198*	0.0706
	(-0.59)	(-1.39)	(0.64)	(-0.54)	(1.69)	(0.03)
Tobin's Q	0.841***	0.504	1.070	0.487	1.057***	1.039***
	(4.82)	(1.30)	(1.22)	(1.01)	(3.87)	(2.86)
Size	2.071***	2.577***	1.311	1.845**	2.037***	0.857
	(7.46)	(4.46)	(1.20)	(2.03)	(4.21)	(1.33)
Leverage	-0.0749***	-0.0133	-0.141**	-0.0358	-0.117***	-0.0102
	(-4.70)	(-0.38)	(-2.43)	(-0.62)	(-4.73)	(-0.29)
Cash ratio	0.0809***	0.0301	0.0488	0.176***	0.108***	0.0391
	(4.27)	(0.77)	(0.75)	(3.00)	(3.27)	(1.02)
ROE	-0.00499	-0.0465*	-0.0233	-0.0621	0.00755	-0.0283
	(-0.47)	(-1.71)	(-0.17)	(-1.28)	(0.63)	(-0.69)
ROA	0.0371	0.109	0.111	0.0849	0.104*	-0.0646
	(0.83)	(1.07)	(0.25)	(0.53)	(1.71)	(-0.44)
Loss (dummy)	0.435	-4.300*	-3.523	-1.921	2.030	-0.678
	(0.38)	(-1.70)	(-0.63)	(-0.50)	(1.24)	(-0.23)
R&D & SGA	0.0314**	0.0459	-0.141**	-0.0755	0.0343	0.0507
	(2.00)	(1.46)	(-2.04)	(-1.49)	(1.46)	(0.94)
Inventory turnover	-0.00250	-0.00760	0.0102	0.00485	0.00301	-0.0139**
	(-0.89)	(-1.37)	(0.81)	(0.57)	(0.57)	(-2.52)
BTM	1.297**	0.263	-1.291	-0.242	2.224**	0.462
	(2.34)	(0.19)	(-0.55)	(-0.17)	(2.15)	(0.50)
Negative BTM (dummy)	2.164	-0.820	0	5.347	1.726	33.63***
	(0.97)	(-0.18)	(.)	(0.46)	(0.66)	(4.29)
Momentum	0.0704***	0.0929***	0.127***	0.0802***	0.0688***	0.0469***
	(8.29)	(4.93)	(4.44)	(3.37)	(4.73)	(2.68)
Idiosyncratic risk	0.480***	1.113***	0.352	0.341	0.461***	0.450**
	(5.26)	(4.27)	(0.72)	(1.41)	(3.41)	(2.32)
Market share	1.673	-6.697*	1.932	11.29	3.856	4.332
	(0.98)	(-1.94)	(0.36)	(1.51)	(1.26)	(1.13)
Dividend payout	-0.000848	-0.0166***	-0.0256	0.00167	0.0127**	-0.00564
	(-0.26)	(-2.63)	(-0.97)	(0.16)	(2.44)	(-0.97)
N	5,965	1,365	402	639	2,338	1,221
Adj. R^2	0.247	0.221	0.273	0.199	0.312	0.187
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

at the 10% level (*t*-stat=1.69). A one SD (0.216 for North America, not tabulated) increase in *ES* is associated with a 0.9% (0.216 * 4.198) higher AR_{Q1} within the North American region; we interpret this as a non-negligible but also not major "rainy day" effect of North American stocks during the COVID-19 crisis.

This result is weaker compared to findings by Albuquerque et al. (2020), who report that a similar increase in *ES* was associated with a 1.8% higher AR_{Q1} among U.S. firms. To illustrate, consider two North American firms that differ in *ES*, at the 75th percentile (0.431) and the 25th percentile (0.146). Our baseline model predicts that the firm with an ES rating at the 75th percentile showed a 1.20% ((0.431 – 0.146) * 4.198) higher AR_{Q1}. To put this in perspective, our model estimates that the impact of *ES* on AR_{Q1} is approximately 2/5th the magnitude of *cash ratio* and *leverage* among North American firms, respectively, which are both dominant predictors of corporate resilience in times of crisis. A likely explanation for the weaker impact of *ES* in our analysis compared to Albuquerque et al. (2020) is the inclusion of additional control variables that are correlated with *ES*.

Overall, the results in Tables 2 and 3 indicate that firms with higher ES ratings around the world did not have greater abnormal stock returns during 2020:Q1, except for North American firms.

4.4 Robustness tests of the performance of ESG stocks during COVID-19

Table 4 presents a number of robustness tests of our baseline results of the performance of ESG stocks during COVID-19. For comparison purposes, we include the baseline regression results for the global sample (from Table 2) in the first column. In model (2) of Table 4, we replace the *arithmetic return-based* AR_{Q1}, stock *momentum* and *idiosyncratic risk* with their *log return-based* variants. In models (2) and (3), we replace the *abnormal* returns as dependent variable by *raw buy-and hold* returns.

We measure raw returns over 2020:Q1 in model (2) of Table 4 and over the "fever period" in model (3), which we define as the period from February to March 18, as proposed by Ramelli and Wagner (2020) and applied by Albuquerque et al. (2020). Model (5) uses the TRBC industry group classification instead of the 2-digit SIC code classification to define industry-fixed effects. Overall, Table 4 shows that none of the four robustness analyses indicates that stocks with higher ES ratings in our global sample significantly outperformed stocks with lower ES ratings during the COVID-19 crisis. In fact, two of the four tests (those based on raw returns in 2020:Q1 and in the fever period) suggest that firms with higher ES ratings actually underperformed significantly, although again the economic magnitudes of these effects are limited.

Table 4: Robustness of regression results of stock returns during COVID-19 on ES rating
This table presents the results of our robustness tests. Column 1 contains the baseline model (see Table 2). Column 2 shows regression results after we replace *arithmetic-based returns* with *log-based returns* in the calculations of our independent and dependent variables. Columns 3 and 4 show regression results when we replace *abnormal returns* by *raw returns*, over 2020:Q1 and the "fever period" (Ramelli and Wagner, 2020) from February 24 to March 18 (Albuquerque et al., 2020). In models 1 to 4, we maintain a 2-digit SIC codes industry classification in the industry-fixed effects, and in model 5 we apply a TRBC industry group classification. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database. *(log)* AR_{Q1} and all continuous controls are winsorized at the 1st and 99th percentile. Appendix B provides a detailed variable description. All models include heteroscedasticity robust standard errors. Intercepts are suppressed to conserve space. Parentheses contain *t*-statistics. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	AR_{Q1}	*Log* AR_{Q1}	RR_{Q1}	RR_{fever}	AR_{Q1}
ES	-0.775	-2.548	-4.112***	-2.180*	-0.241
	(-0.59)	(-1.21)	(-3.19)	(-1.95)	(-0.18)
Tobin's Q	0.841***	1.228***	1.373***	0.767***	0.712***
	(4.82)	(4.81)	(3.66)	(5.89)	(3.90)
Size	2.071***	2.997***	1.616***	0.856***	2.035***
	(7.46)	(6.63)	(4.48)	(3.60)	(7.44)
Leverage	-0.0749***	-0.165***	-0.0864***	-0.0850***	-0.0561***
	(-4.70)	(-6.35)	(-4.91)	(-6.36)	(-3.43)
Cash Ratio	0.0809***	0.127***	0.0333	0.0389***	0.0510***
	(4.27)	(4.47)	(1.59)	(2.67)	(2.62)
ROE	-0.00499	-0.00656	0.00225	0.00220	-0.0110
	(-0.47)	(-0.38)	(0.15)	(0.24)	(-1.06)
ROA	0.0371	0.0745	0.0587	0.0664*	0.108**
	(0.83)	(1.03)	(0.82)	(1.80)	(2.33)
Loss	0.435	0.125	1.836	0.810	1.027
	(0.38)	(0.07)	(1.50)	(0.85)	(0.89)
R&D & SGA	0.0314**	0.0685***	0.0787***	0.0169	0.0227
	(2.00)	(2.78)	(2.83)	(1.34)	(1.39)
Inventory turnover	-0.00250	-0.00100	0.000376	-0.000575	-0.00151
	(-0.89)	(-0.22)	(0.13)	(-0.24)	(-0.55)
BTM	1.297**	0.308	-0.974	0.0229	1.348**
	(2.34)	(0.32)	(-1.31)	(0.05)	(2.40)
Negative BTM (dummy)	2.164	1.820	2.078	1.678	2.326
	(0.97)	(0.50)	(0.79)	(0.94)	(1.05)
Momentum	0.0704***	0.135***	0.0389***	-0.0149**	0.0739***
	(8.29)	(7.96)	(2.91)	(-2.17)	(8.53)
Idiosyncratic risk	0.480***	0.303*	-0.273**	-0.521***	0.444***
	(5.26)	(1.91)	(-2.56)	(-7.75)	(4.72)
Market share	1.673	5.045*	-0.262	-0.136	-2.338
	(0.98)	(1.88)	(-0.14)	(-0.08)	(-1.47)
Dividend payout	-0.000848	0.00255	0.00842**	0.00449	0.00234
	(-0.26)	(0.44)	(2.37)	(1.58)	(0.73)
N	5,965	5,957	5,965	5,965	5,965
Adj. R^2	0.247	0.305	0.281	0.376	0.284
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

4.5 Specific measures of ESG performance and abnormal stock returns during COVID-19

In this subsection, we examine whether more detailed ESG sub-ratings can explain abnormal stock returns during 2020:Q1. We are specifically interested in ESG category ratings within the S pillar (except for Product Responsibility) and ESG theme ratings under the Workforce category, as these ratings are arguably of specific interest for understanding how well different firms handled the consequences of COVID-19 and thus their stock price responses in 2020:Q1. Table 5 presents a correlation matrix of all ESG (sub-)ratings under consideration and shows that most ESG (sub)ratings are highly intercorrelated, which raises concerns about multicollinearity in our regressions. To mitigate these concerns, we include one ESG (sub-)rating in our cross-sectional regressions at the time.

The results of these more specific analyses are presented in Table 6. This table presents the coefficient on the ESG (sub-)rating from our cross-sectional regressions with abnormal returns over 2020:Q1 (AR_{Q1}) as dependent variable, as well as its *t*-statistic, the adjusted R2, and the number of observations used in each regression. All regressions in Table 6 include the full set of control variables and industry- and country-fixed effects, as in our baseline model in Table 2. For each ESG (sub-) rating that we consider, we present results both for the global sample and for North America. Again, we include the baseline regression results of *ES* for the global sample (from Table 2) in the first row. In the second row, we include the *ES* results for North America (from Table 3).

In the remaining rows of Table 6, we first present the results when we use the overall ESG rating or the individual E, S, and G pillar ratings separately instead of the ES rating. We then add a first layer of detail to our analysis and estimate the effect of the ESG category ratings of firms on AR_{Q1}. We include category ratings for *Community*, *Human Rights*, and *Workforce*. Next, we introduce a further layer of detail as we narrow down the Workforce context and estimate the effects of ESG theme ratings, including *Diversity and Inclusion* (DI), *Health and Safety* (HS), *Training and Development* (TD), and *Employment Quality* (EQ). From the latter theme, we select six metrics that we perceive as particularly material in the context of the COVID-19 pandemic, which we label as "*Custom Theme*" (CT). Appendix B provides a detailed description of all these ESG (sub-)ratings.

Taken together, the results in Table 6 indicate that there is little evidence that the abnormal stock returns of around 6,000 firms around the world are systematically related to ESG (sub-)ratings. Of the 13 ESG (sub-)ratings included in the table, only one has a coefficient that is statistically significant, namely the G rating with a coefficient

of −2.032 (*t*-stat = −1.83). This finding suggests that firms with better governance actually showed worse stock market performance during 2020:Q1. However, both the statistical and the economic significance of this effect are modest, and we need to take into account the possibility that this is a "false positive" (type I error), given the multiple tests presented in this table.

Table 5: ESG correlation matrix

This table presents a correlation matrix of all Refinitiv ESG (sub-)ratings in this study (N=6,824), including the average of Environmental and Social pillar (ES), the average of Environmental, Social and Governance pillar (ESG), the Environmental pillar (E), the Social pillar (S), the Governance pillar (G), the Community category (Com), the Human Rights category (Rights), the Workforce category (Work), the Health and Safety theme (HS), the Training and Development theme (TD), the Employment Quality theme (EQ), the Diversity and Opportunity theme (DO), and a Custom theme (CT). Appendix B provides a detailed variable description. Market and financial data are from Thomson Reuters' Datastream/Worldscope and ESG data are from Thomson Reuters' Refinitiv ESG Database. * p<0.1, ** p<0.05, *** p<0.01.

	ES	ESG	E	S	G	Com
ES	1					
ESG	0.945***	1				
E	0.948***	0.893***	1			
S	0.916***	0.869***	0.740***	1		
G	0.423***	0.695***	0.394***	0.396***	1	
Com	0.513***	0.517***	0.364***	0.624***	0.306***	1
Rights	0.753***	0.707***	0.630***	0.794***	0.305***	0.364***
Work	0.689***	0.652***	0.605***	0.691***	0.294***	0.250***
HS	0.650***	0.620***	0.579***	0.641***	0.290***	0.257***
TD	0.618***	0.597***	0.548***	0.614***	0.296***	0.231***
DI	0.645***	0.617***	0.564***	0.649***	0.294***	0.301***
EQ	−0.0498***	−0.0653***	−0.0557***	−0.0350***	−0.0715***	−0.148***
CT	0.688***	0.656***	0.615***	0.677***	0.306***	0.279***

	Rights	Work	HS	TD	DI	EQ	CT
ES							
ESG							
E							
S							
G							
Com							
Rights	1						
Work	0.536***	1					
HS	0.517***	0.719***	1				
TD	0.487***	0.713***	0.515***	1			
DI	0.498***	0.755***	0.477***	0.478***	1		
EQ	−0.0310**	0.187***	−0.0422***	−0.00687	−0.0288**	1	
CT	0.529***	0.776***	0.831***	0.535***	0.694***	−0.0396***	1

Table 6: Cross-sectional regressions of stock returns during COVID-19 on ESG (sub-)ratings
This table presents baseline model regressions (see Table 2) of abnormal stock returns over 2020:Q1 (AR_{Q1}) on various ESG (sub-)ratings for the global sample (N=6,824) and the North American subsample (N=2,734). ESG (sub-)ratings include the average of the Environmental and Social pillar (*ES*), the average of the Environmental, Social pillar and Governance pillar (*ESG*), the Environmental pillar (E), the Social pillar (S), the Governance pillar (G), the Community category (*Com*), the Human Rights category (*Rights*), the Workforce category (*Work*), the Health and Safety theme (*HS*), the Training and Development theme (*TD*), the Employment Quality theme (*EQ*), the Diversity and Opportunity theme (*DO*), and a Custom theme (*CT*). Geographical classification is derived from Ken French's website. We use 2-digit SIC codes industry classification in the industry-fixed effects. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database. AR_{Q1} and all continuous controls are winsorized at the 1st and 99th percentile. Appendix B provides a detailed variable description. All models include heteroscedasticity robust standard errors. Intercepts are suppressed to conserve space. Parentheses contain *t*-statistics. * *p*<0.1, ** *p*<0.05, *** *p*<0.01.

	Sample	AR_{Q1}	t-stat	Adj. R^2	N	Controls	FE
ES	Global	-0.775	(-0.59)	0.247	5,965	Yes	Industry + Country
	North America	*4.198**	*(1.69)*	*0.312*	*2,338*	*Yes*	*Industry + Country*
ESG	Global	-1.907	(-1.27)	0.247	5,965	Yes	Industry + Country
	North America	*3.498*	*(1.21)*	*0.312*	*2,338*	*Yes*	*Industry + Country*
E	Global	-1.358	(-1.21)	0.247	5,965	Yes	Industry + Country
	North America	*2.845*	*(1.39)*	*0.312*	*2,338*	*Yes*	*Industry + Country*
S	Global	0.301	(0.23)	0.247	5,965	Yes	Industry + Country
	North America	*4.813**	*(1.67)*	*0.312*	*2,338*	*Yes*	*Industry + Country*
G	Global	-2.032*	(-1.83)	0.248	5,965	Yes	Industry + Country
	North America	*0.207*	*(0.10)*	*0.311*	*2,338*	*Yes*	*Industry + Country*
Com	Global	-0.832	(-0.80)	0.268	5,373	Yes	Industry + Country
	North America	*-1.783*	*(-0.78)*	*0.337*	*2,103*	*Yes*	*Industry + Country*
Rights	Global	-0.116	(-0.11)	0.268	5,373	Yes	Industry + Country
	North America	*1.257*	*(0.68)*	*0.337*	*2,103*	*Yes*	*Industry + Country*
Work	Global	0.802	(0.79)	0.268	5,373	Yes	Industry + Country
	North America	*4.404***	*(2.42)*	*0.339*	*2,103*	*Yes*	*Industry + Country*
DI	Global	-0.473	(-0.46)	0.260	5,763	Yes	Industry + Country
	North America	*1.039*	*(0.54)*	*0.326*	*2,235*	*Yes*	*Industry + Country*
HS	Global	-0.0276	(-0.03)	0.263	5,713	Yes	Industry + Country
	North America	*1.601*	*(0.91)*	*0.327*	*2,233*	*Yes*	*Industry + Country*
TD	Global	-0.0844	(-0.09)	0.263	5,713	Yes	Industry + Country
	North America	*1.137*	*(0.68)*	*0.327*	*2,233*	*Yes*	*Industry + Country*
EQ	Global	1.355	(1.47)	0.261	5,231	Yes	Industry + Country
	North America	*1.366*	*(0.93)*	*0.329*	*2,079*	*Yes*	*Industry + Country*
CT	Global	0.508	(0.51)	0.263	5,713	Yes	Industry + Country
	North America	*1.073*	*(0.60)*	*0.327*	*2233*	*Yes*	*Industry + Country*

For North America, the picture is somewhat different. The positive and significant effect of ES on 2020:Q1 abnormal returns for North American firms documented in Table 3 appears to stem from the S pillar rating, which has a similar coefficient and *t*-statistic as *ES*, while the coefficients on neither E nor G are significant. Within the S pillar, the category rating for *Workforce* is the only one with a significant coefficient (4.404, with a *t*-statistic of 2.42), in line with the impression that the abnormal performance of firms during the COVID-19 crisis may be partly explained by how well firms treat their employees. At the same time, these results seem to suggest a different (or complementary) explanation for the outperformance of North American firms with higher ESG ratings than the customer and investor loyalty explanation proposed by Albuquerque et al. (2020).

None of the five theme ratings within the *Workforce* category in Table 6 (that is, *DI*, *HS*, *TD*, *EQ*, and *CT*) have a significant coefficient for North America, and we thus fail to uncover the specific aspect of the *Workforce* rating that explains cross-sectional differences in stock market performance during the COVID-19 crisis. All in all, the results in Table 6 support our earlier conclusion that firms with higher ESG ratings did not outperform their peers in 2020:Q1, with the exception of firms in North America.[8]

4.6 Panel regression results on the performance of ESG stocks over 2003-2020

Our analyses of the resilience of global ESG stocks during crisis periods has thus far zoomed in on the stock market crash resulting from the COVID-19 pandemic in the first quarter of 2020. Prior studies document such resilience during earlier crises (e.g., Lins et al., 2017, for the 2008-2009 financial crisis). To examine the performance of global ESG stocks during crisis periods more generally, we proceed to carry out panel data analyses that relate global stock returns to ESG ratings, as well as to ESG ratings interacted with a dummy variable indicating global crisis episodes (as indicated by the 10% of months with the worst return on the MSCI Global index) over 2003-2020. Table 7 presents summary statistics for the variables included in these global panel analyses. Following the large asset pricing literature, we include a broad range of control variables, basing this on Bolton and Kacperczyck (2020).

Table 8 shows the estimation results of our panel data models. In Panel A, we regress monthly stock returns on the ES rating, an indicator variable for global crisis months (*Crisis*), and the interaction between *ES* and the global crisis dummy. The coefficients on the control variables are not reported to conserve space. In model (1)

8 We obtain similar results when we exclude the FAANGMT stocks from the global and North American samples in Table 6.

Table 7: Summary statistics for the panel data analysis over 2003–2020
This table shows summary statistics for the full sample (N=7,559). The independent variable and all continuous market-based controls are winsorized at the 1st and 99th percentile in the cross-section. All continuous accounting-based controls are winsorized at the 1st and 99th percentile in the cross-section. Appendix B provides a detailed variable description. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database.

	Count	Mean	SD	Min	p25	Median	p75	Max
$Return_{RI}$	556,410	0.693	10.616	-72.230	-4.858	0.625	6.056	114.245
ESG	556,410	0.394	0.202	0.001	0.232	0.366	0.544	0.953
ES	556,410	0.354	0.237	0.000	0.153	0.305	0.538	0.972
E	556,410	0.310	0.283	0.000	0.028	0.252	0.541	0.991
S	556,410	0.398	0.231	0.001	0.215	0.367	0.563	0.986
G	556,410	0.475	0.226	0.002	0.292	0.474	0.655	0.993
BTM	556,410	0.646	0.662	-0.517	0.251	0.466	0.823	11.533
Negative BTM (dummy)	556,410	0.020	0.141	0.000	0.000	0.000	0.000	1.000
Size	556,410	8.264	1.461	2.474	7.404	8.289	9.197	11.745
Leverage	556,410	26.210	19.122	0.000	11.573	24.642	37.689	102.113
ROE	556,410	9.855	33.689	-287.292	4.340	10.759	18.445	199.110
ROA	556,410	3.993	11.462	-125.974	1.578	4.375	8.250	33.297
Loss (dummy)	556,410	0.151	0.358	0.000	0.000	0.000	0.000	1.000
Cash Ratio	556,410	14.330	15.432	0.005	4.038	9.376	18.804	96.920
Tobin's Q	556,410	2.017	1.904	0.376	1.079	1.436	2.192	34.210
Dividend payout	556,410	39.102	79.708	-369.715	0.000	26.360	54.365	580.660
Inventory turnover	556,410	65.764	86.730	0.000	6.581	43.929	88.370	567.456
Market share	556,410	0.111	0.214	0.000	0.008	0.029	0.096	1.370
R&D & SGA	556,410	18.916	23.951	0.000	2.309	10.624	26.756	215.050
Beta	556,410	1.085	0.502	-0.820	0.752	1.023	1.344	5.065
Volatility	556,410	9.684	5.533	0.000	6.078	8.285	11.599	69.843
Reversal	556,410	0.728	10.579	-72.230	-4.797	0.654	6.070	114.245
Momentum	556,410	0.773	3.143	-17.558	-0.847	0.849	2.443	26.614
Asset growth	556,410	3.859	55.636	-553.926	-2.979	3.606	13.548	1463.070
EPS growth	556,410	-0.000	0.000	-0.015	-0.000	0.000	0.000	0.011

of Panel A, we find that the coefficient on *ES* is not statistically significant, suggesting that over this extended time period there has been no systematic relation between ES ratings and stock returns. Naturally, the coefficient on the crisis dummy is large, negative, and statistically significant (at -11.57, with a *t*-stat of -8.59), which indicates that – after controlling for a large number of covariates – the stocks in our global sample on average dropped by over 10% in global crisis months. The coefficient on the interaction term *ES*Crisis* is equal to 2.102 (*t*-stat = 2.16). According to this specification, this implies that firms with higher ES ratings did show better stock market performance during crisis periods over 2003–2020. A one SD increase in the ES rating (0.237, from Table 7) is associated with a 0.5% (0.237 * 2.102) higher return during crisis

Table 8: Panel regressions of stock returns on ES rating and crisis indicator over 2003-2020

This table presents regression results of stock returns (*RRt*) on the ESG performance of firms, measured as the average of Refinitiv's Environmental and Social pillar rating (*ES*), an indicator variable for global financial crises (*Crisis*; defined as the 10% of months with the worst return on the MSCI Global index) and various controls, across the global sample (N=7,559). The sample period is January 2003 to August 2020. Panel A shows regression results for various fixed effects. Panel B shows regression results for alternative measures of ESG performance. Panel C shows regression results for different geographical regions. We use 2-digit SIC codes industry classification in the industry-fixed effects. Market and financial data are from Thomson Reuters' Datastream/ Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database. The dependent variable and all continuous controls are winsorized at the 1st and 99th percentile in the cross-section. Appendix B provides a detailed variable description. Intercepts are suppressed to conserve space. All models include heteroscedasticity robust standard errors and are clustered at the firm and year level. Parentheses contain *t*-statistics. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Panel A: Panel regression results with different fixed effects

	(1)	(2)	(3)	(4)
Dependent variable:	RR_t	RR_t	RR_t	RR_t
ES	-0.179	-0.0340	-0.0274	-0.0435
	(-0.50)	(-0.15)	(-0.16)	(-0.35)
Crisis	-11.57***	-	-	-
	(-8.59)	(0.00)	(0.00)	(0.00)
*ES*Crisis*	2.102**	0.600	0.971**	0.614
	(2.16)	(1.12)	(2.24)	(1.63)
N	556,410	555,655	555,927	555,165
Adj. R^2	0.106	0.297	0.321	0.374
Controls	Yes	Yes	Yes	Yes
Industry-Month FE	No	Yes	No	Yes
Country-Month FE	No	No	Yes	Yes

Panel B: Panel regression results with different ESG (sub-)ratings

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	RR_t	RR_t	RR_t	RR_t	RR_t
ES	-0.0435				
	(-0.35)				
*ES*Crisis*	0.614				
	(1.63)				
ESG		-0.0229			
		(-0.16)			
*ESG*Crisis*		0.686			
		(1.45)			
E			-0.0699		
			(-0.76)		
*E*Crisis*			0.396		
			(1.39)		
S				0.00316	
				(0.03)	
*S*Crisis*				0.694*	
				(1.84)	
G					0.0163
					(0.17)
*G*Crisis*					0.315
					(0.86)
N	555,165	555,165	555,178	555,165	556,369
Adj. R^2	0.374	0.374	0.374	0.374	0.374
Controls	Yes	Yes	Yes	Yes	Yes
Industry-Month FE	Yes	Yes	Yes	Yes	Yes
Country-Month FE	Yes	Yes	Yes	Yes	Yes

Panel C: Panel regression results for different geographic regions						
	Global	Europe	Japan	Asia-Pacific	North America	Emerging Countries
Dependent variable:	RR_t	RR_t	RR_t	RR_t	RR_t	RR_t
ES	-0.0435	0.0498	0.330	-0.792***	-0.286	0.117
	(-0.35)	(0.25)	(1.22)	(-3.05)	(-1.60)	(0.50)
*ES*Crisis*	0.614	0.297	-1.771*	1.482	1.795**	0.335
	(1.63)	(0.35)	(-1.79)	(1.66)	(2.78)	(0.45)
N	555,165	134,016	60,319	64,701	204,707	83,699
Adj. R^2	0.374	0.437	0.405	0.355	0.378	0.425
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Month FE	Yes	Yes	Yes	Yes	Yes	Yes

months, which is a relatively small effect since it implies that stocks with a considerably better ES rating (by one standard deviation) showed a slightly less negative stock return of only 0.5% per month in this period (compared to an average stock market decline of over 10%).

Moreover, both the magnitude of the coefficient on *ES*Crisis* and its statistical significance decrease when accounting for industry and country effects in the other specifications in Panel A of Table 8. In model (2), we add industry-month fixed effects, which means that we remove time-series variation in stock returns that are purely driven by industry effects.[9] In model (3), we include country-month fixed effects, which implies that we remove time-series variation in returns that are purely driven by country effects. Model (4) incorporates both industry-month and country-month fixed effects. We note that the crisis dummy variable is subsumed by these fixed effects, so that we can no longer estimate its coefficient.

Overall, these three specifications show little evidence that ES ratings are related to stock returns over 2003-2020, neither during nor outside of crisis periods. The coefficient on the interaction term *ES*Crisis* is still significant in model (3), but with an even smaller coefficient than in model (1). In the most conservative regression specification model (4), the coefficients on *ES* and *ES*Crisis* are small and statistically insignificant. These findings indicate that the significant interaction effect in model (1) cannot be distinguished from pure industry effects, making it impossible to identify whether firms with higher ES ratings performed somewhat better during crisis months because of their ES rating per se or because they belonged to a certain industry.

In Panel B of Table 8, we assess the robustness of the baseline results from Panel A (reproduced in model (1) of Panel B) to using the overall ESG rating or the E, S, or

9 Note that the number of observations in Table 8 (model (2), (3) and (4)) is lower than reported in model (1). This is because a number of singleton observations (firms with just one observation in the sample) were dropped in models (2), (3), and (4).

G pillar ratings instead of the ES rating (models (2) through (5)). After controlling for country and industry effects, we find no relation between stock returns and the ESG, E, and G (sub-)ratings, although we do find a significant interaction coefficient on *S*Crisis* (coef = 0.694; *t*-stat = 1.84). This coefficient indicates that a one SD increase in the S rating (0.231, from Table 7) is associated with a 0.16% (0.231 * 0.694) higher return during crisis months. Although this finding is interesting and aligns well with our finding in Table 6 that the S pillar rating is the relatively more powerful explanatory variable for the COVID-19 crisis returns in North America, the modest economic and statistical significance lead us to caution against overemphasizing the importance of this result for global investors.

In Panel C of Table 8, we re-estimate our baseline panel regressions for global stocks from Panel A (again reproduced in model (1) of Panel C) for the following regions: Europe, Japan, Asia-Pacific, North America and Emerging Countries. The results generally line op with those of Panels A and B in the sense that the coefficients on both *ES* and *ES*Crisis* are mostly economically small and statistically insignificant. Our results do show a negative and weakly statistically significant coefficient on *ES*Crisis* for Japan (coef = -1.771; *t*-stat = -1.79). We also find a statistically significant coefficient on the ES for Asia-Pacific, although the coefficient on *ES*Crisis* is insignificant for this region. For North America, we find no overall relation between *ES* and stock returns (the coefficient on *ES* itself is not significant). Consistent with the results of Lins et al. (2017), North American stocks with higher ES ratings do appear to perform better during global stock market crisis months more generally, as indicated by the coefficient on *ES*Crisis* of 1.795 (*t*-stat = 2.78). This coefficient suggests that a one SD increase in the ES rating for North American firms (0.213, not tabulated) is associated with a 0.38% (0.213 * 1.795) higher return during crisis months, which is a non-negligible but relatively modest effect considering the large overall crisis effect on stock returns.[10]

Summarizing, the results in Table 8 show that the weak evidence on the resilience of global ESG stocks during the COVID-19 crisis in Tables 3-6 applies more generally to financial crises over a prolonged period of time of almost two decades. The only exception is North America, where stocks with higher ESG ratings did appear to show some resilience not only to the COVID-19 crisis but also to crises more generally over 2003-2020.

10 Again, excluding the FAANGMT stocks does not materially affect the results of the regressions in Table 8.

5. Conclusion

Following the 2008 financial crisis, the view that shareholder value maximization should be the sole or main goal for business leaders and investors has been seriously questioned by many researchers and policymakers. The alternative view that firms that comprehensively maximize the value for *all* firm stakeholders is receiving growing support. According to some, firms with superior ESG performance, that focus on stakeholder value rather than shareholder value alone, may deliver higher stock prices and greater resilience to external unexpected shocks. We empirically investigate this issue by testing whether firm-level ESG ratings are positively associated with (abnormal) stock returns during the COVID-19 crisis in the first quarter of 2020 in a global setting. We show that, when we control for country-wide effects, stronger ESG firms did not show better stock returns because of the ES (or ESG) rating, but because they are domiciled in countries whose stocks in general showed a relatively better (abnormal) stock return. Such country-wide effects cannot be reliably attributed to the sustainability profile of individual firms per se. We obtain similar results in a broader analysis of global financial crises over the 2003-2020 period. Only for the North America region do we find some evidence of greater resilience in terms of stock market performance during crisis periods of firms with higher ESG ratings.

The reliability of the ESG ratings used in the empirical analysis is an important precondition for interpreting our results. Notoriously, the input for most ratings are based on self-reported and unaudited data. Also, the measurement and rating aggregation approaches differ across rating providers. As a consequence, ESG ratings, different from financial creditworthiness ratings, show a high degree of inconsistency (Berg et al., 2019; Busch et al., 2020). Besides the technical shortcomings of the ESG ratings currently available, these ratings may fail to fully capture intangible elements such as the social capital endowment, the corporate culture, and the perceived sustainability product differentiation, all of which are supposed to financially benefit the socially responsible firms and not the firms that invest less in sustainability. Future research should shed light on which ESG ratings are more reliable, and on whether our results depend on the ESG ratings used.

A further possible limitation of our study lies in the imperfect synchronicity of the shock across countries, as well as in the heterogeneous responses put in place by different governments around the world. The speed and quality of government responses (or the lack thereof) were markedly heterogeneous, and some specific national policy measures may have weighted in the market's perception of the ability of firms to weather the pandemic.

Nonetheless, the face value of our findings supports the view that firms with higher ESG ratings were not more resilient to the COVID-19 shock than firms with lower ESG ratings. At best, the contribution of corporate sustainability to the financial resilience of firms is geography-dependent and limited to the North American market. Our results also suggest that the supposed ability of firms with superior ESG ratings to attract responsible investors who are oriented to the long term did not shield them from the financial impact of the COVID-19 pandemic. Having said that, over the extended time period from 2003 to 2020, we also find no significant evidence of stock market underperformance by stronger ESG stocks.

We emphasize that, although our results caution against simplistic views on "doing well while doing good", the debate on whether stakeholder value maximization comes at the expense of shareholder wealth is far from settled. We propose three avenues of research that could enrich our understanding of the performance of ESG stocks in the context of an exogenous shock. First, new metrics should be explored in order to fully capture the sustainability footprint of firms. This issue is high on the agenda of researchers and investment professionals, and new more reliable metrics could lead to different conclusions. Second, we need to complement our knowledge by investigating the impact of the COVID-19 pandemic on corporate financial assets different from equity, *in primis* corporate bonds. Third, we still have an only limited understanding of how investors actually incorporate ESG considerations in the investment process and of the extent to which responsible investors can influence the pricing of ESG factors in global financial assets.

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Appendix A: Refinitiv's ESG scoring hierarchy

Figure A1 shows Refinitiv's data structure to evaluate corporate ESG performance. 186 ESG Metrics, divided over ten categories, are used to construct an Environmental, Social, and Governance rating. For example, the Workforce rating (under the Social pillar) is calculated based on thirty different ESG metrics. Figure A2 shows the steps involved in the Refinitiv ESG rating methodology.

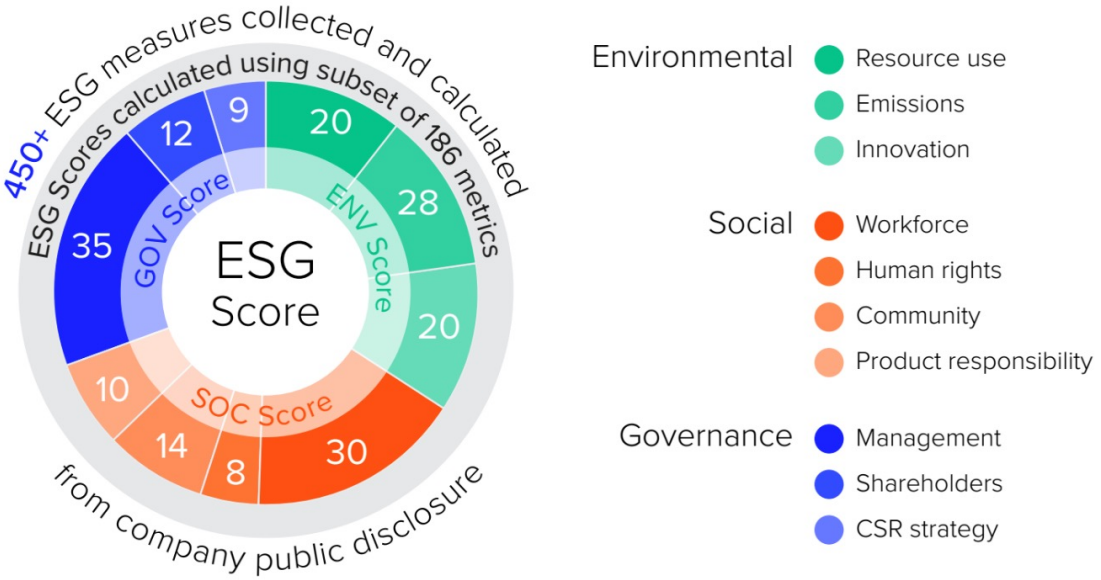

Figure A1. Source: Refinitiv. April 2020. "Environmental. Social and Governance (ESG) ratings from Refinitiv". Downloaded from: *https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/esg-ratings-methodology.pdf*

The Refinitiv ESG scoring methodology can be summarized and illustrated by means of a five-step process flow.

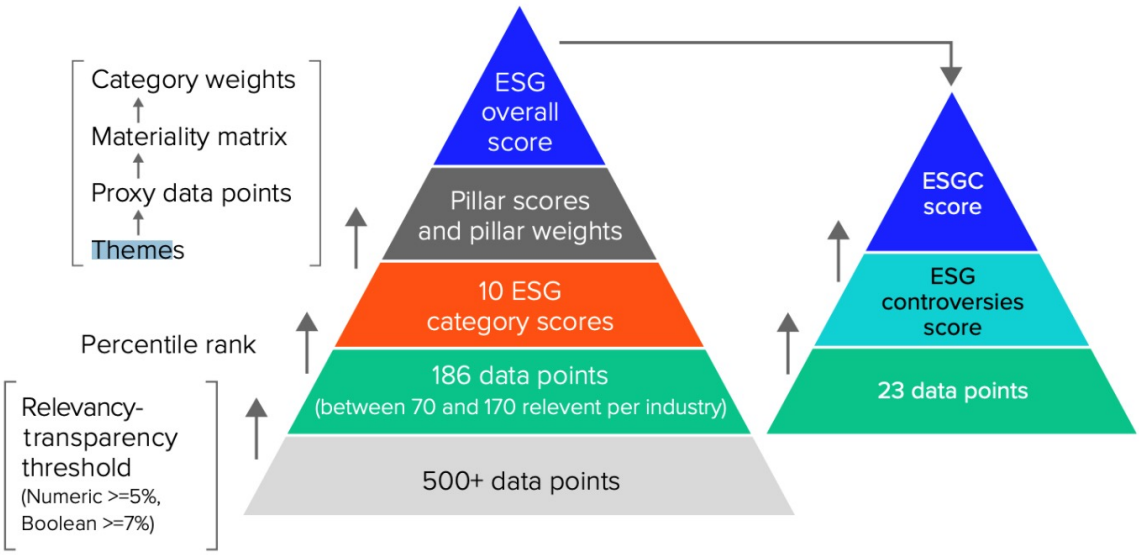

Figure A2. Source: Refinitiv. April 2020. "Environmental. Social and Governance (ESG) ratings from Refinitiv". Downloaded from: *https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/esg-ratings-methodology.pdf*

Appendix B: Variable descriptions

This table presents variable descriptions. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and sustainability data are from Thomson Reuters' Refinitiv ESG Database. Datastream identifiers are shown in parentheses.

Variable	Definition	Source
ES	The simple average of Refinitiv's Environmental (ENSCORE) and Social (SOSCORE) Pillar Ratings divided by 100.	Refinitiv
ESG	The simple average of Refinitiv's Environmental (ENSCORE), Social (SOSCORE), and Governance (CGSCORE) Pillar Ratings divided by 100.	Refinitiv
E	Refinitiv's Environmental (ENSCORE) Pillar Ratings divided by 100.	Refinitiv
S	Refinitiv's Social (SOSCORE) Pillar Ratings divided by 100.	Refinitiv
G	Refinitiv's Governance (CGSCORE) Pillar Ratings divided by 100.	Refinitiv
Community	Refinitiv's rating for the Community category (TRESGSOCOS), which is subject to the Social Pillar. Measured for the year 2018.	Refinitiv
Human Rights	Refinitiv's rating for the Human Rights category (TRESGSOHRS), which is subject to the Social Pillar. Measured for the year 2018.	Refinitiv
Workforce	Refinitiv's rating for the Workforce category (TRESGSOWOS), which is subject to the Social Pillar. Measured for the year 2018.	Refinitiv
DI	Average relative performance rating across 10 Diversity and Inclusion-related ESG metrics under the Workforce category. Measured for the year 2018.	Refinitiv
HS	Average relative performance rating across 9 Health and Safety-related ESG metrics under the Workforce category. Measured for the year 2018.	Refinitiv
EQ	Average relative performance rating across 6 Employment Quality-related ESG metrics under the Workforce category. Measured for the year 2018.	Refinitiv
TD	Average relative performance rating across 5 Training and Development- related ESG metrics under the Workforce category. Measured for the year 2018.	Refinitiv
CT (custom theme)	Average relative performance rating across 6 Health and Safety-related ESG metrics under the Workforce category. Measured for the year 2018.	Refinitiv
AR_{Q1}	The difference between 2020:Q1 arithmetic stock return (derived from RI) and beta, times the 2020:Q1 return of the local benchmark (derived from LI). 2020:Q1 returns are estimated from January 1, 2020 to April 1, 2020. Beta is estimated by using 60-month estimation window between 2015 and 2019, where the market factor is arithmetic return of the local benchmark (derived from LI). All values are measured in US$.	Datastream
Tobin's Q	Total asset value (WC02999) minus book value of equity (WC05476 * WC05301) + market value of equity (WC08001), all divided by total assets (WC02999). All values are measured in US$.	Worldscope
Size	Natural log of market cap (WC08001) in million US$.	Worldscope
Cash ratio	Cash and short-term investments (WC02001) over total assets (WC02999) and multiplied by 100. All values are measured in US$.	Worldscope
Leverage	Total debt (WC03255) over total assets (WC02999) and multiplied by 100. All values are measured in US$.	Worldscope
ROE	Net income (WC01706) over book value of equity (WC05476 * WC05301) and multiplied by 100. All values are measured in US$.	Worldscope
ROA	Net income (WC01706) minus extraordinary items (WC04225) minus discontinued operations (WC4054), all divided by total assets (WC02999) and multiplied by 100. Set to zero if missing. All values are measured in US$.	Worldscope

Variable	Definition	Source
Loss	A dummy set to one if ROA<0.	Worldscope
Inventory turnover	Firm-specific inventory turnover (WC01051/WC02101) divided by the average industry inventory turnover and multiplied by 100. Set to zero if missing. Industry classification by 2-digit SIC codes. All values are measured in US$.	Worldscope
R&D & SGA	R&D (WC01202) + 1/3*SGA (WC01101) using 5-year amortization and divided by total assets in year t (WC02999). Set to zero if missing. All values measured in US$.	Worldscope
BTM	Book value of equity (WC05476 * WC05301) divided by market value of equity (WC08001). All values measured in US$ for the year 2019.	Worldscope
BTM negative	A dummy set to one if BTM <0.	Worldscope
Momentum	Buy-and-hold return (RI) of the year prior to the start of the return period. All values expressed in US$. Used in cross-sectional analysis.	Worldscope
Idiosyncratic risk	The firm-specific root mean squared error of the domestic market model regression estimations.	Worldscope
Market share	Revenues (WC01001) divided by total industry revenues and multiplied by 100. Industry classification by 2-digit SIC codes. All values measured in US$.	Worldscope
Dividend payout	Dividends (WC05376) divided by net income (WC01706) and multiplied by 100. All values measured in US$.	Worldscope
EPS growth	EPS (net income (WC01706) divided by the number of outstanding shares (WC05301)) in year t minus EPS in year t-1, divided by the market value of equity (WC08001) in year t. Outcome multiplied by 100.	Worldscope
Asset growth	Total assets (WC02999) in year t minus total assets in year t-1 divided by the market value of equity (WC08001) in year t. Outcome multiplied by 100.	Worldscope
Volatility	12-month rolling standard deviation of return derived from Return Index (RI)	Worldscope
Momentum (panel)	Average return derived from Return Index (RI) over month t-12 to t-1. Used in panel analysis.	Worldscope
Reversal	Return derived from Return Index (RI) in month t-1.	Worldscope
Beta	60-month rolling beta derived from domestic market model, where market return is derived from Local Index (LI) and stock return is derived from Return Index (RI).	Worldscope

Appendix C: Sample composition

The tables in this Appendix present full sample distribution by geography (N=6,824) and industry. Geographical classification is from Ken French's website. Industry distribution is presented based on first digit SIC-codes. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and sustainability data are from Thomson Reuters' Refinitiv ESG Database.

North America		
Country	*N*	*% sample*
USA	2421	35.5%
Canada	313	4.6%
Total	2734	40.1%

Europe		
Austria	28	0.4%
Belgium	47	0.7%
Switzerland	115	1.7%
Germany	170	2.5%
Denmark	40	0,6%
Spain	70	1.0%
Finland	40	0.6%
France	155	2.3%
United Kingdom	450	6.6%
Greece	24	0.4%
Ireland	18	0.3%
Italy	95	1.4%
Netherlands	57	0.8%
Norway	63	0.9%
Portugal	15	0.2%
Sweden	128	1.9%
Luxembourg	17	0.2%
Total	1532	22.5%

Japan		
Japan	436	6.4%
Total	436	6.4%

Asia-Pacific		
Australia	388	5.7%
Hong-Kong	208	3.0%
New Zealand	58	0.8%
Singapore	44	0.6%
Total	698	10.2%

Emerging Countries		
China	333	4.9%
South Korea	125	1.8%
South Africa	127	1.9%
Taiwan	145	2.1%
Russia	41	0.6%
Turkey	51	0.7%
Saudi Arabia	33	0.5%
Thailand	44	0.6%
India	112	1.6%
Indonesia	39	0.6%
Philippines	25	0.4%
Malaysia	57	0.8%
Oman	10	0.1%
Qatar	17	0.2%
United Arab Emirates	19	0.3%
Brazil	83	1.2%
Peru	29	0.4%
Mexico	44	0.6%
Colombia	41	0.6%
Poland	39	0.6%
Egypt	10	0.1%
Total	1424	20.9%

Industry	*N*	*% sample*
Agriculture, Forestry and Fishing	42	0.6%
Mining	442	6.5%
Construction	265	3.9%
Manufacturing	2313	33.9%
Transport	252	3.7%
Communication	203	3.0%
Gas and Electric	282	4.1%
Wholesale Trade	169	2.5%
Retail Trade	386	5.7%
Finance and Insurance	1479	21.7%
Services	962	14.1%
Other	29	0.4%
Total	**6824**	**100%**

Appendix D: Summary statistics by country

This table shows summary statistics for the full sample (N=6,824) by country. 2020:Q1 abnormal returns (AR_{Q1}) are winsorized at the 1st and 99th percentile in the cross-section. Appendix B provides a detailed variable description. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database.

Country		AE	AT	AU	BE	BR	CA
	N	19	28	388	47	83	313
ES score	**Mean**	0.242	0.561	0.297	0.467	0.488	0.345
	Median	0.161	0.555	0.233	0.472	0.530	0.299
ESG score	**Mean**	0.322	0.543	0.357	0.477	0.497	0.392
	Median	0.296	0.566	0.315	0.522	0.531	0.375
AR_{Q1}	**Mean**	3.661	2.809	-3.831	-0.959	3.449	-4.941
	Median	3.364	1.567	-4.405	-4.798	1.636	-5.220
Country		CH	CL	CN	DE	DK	EG
	N	115	41	333	170	40	10
ES score	**Mean**	0.426	0.412	0.265	0.500	0.493	0.200
	Median	0.378	0.354	0.232	0.498	0.472	0.075
ESG score	**Mean**	0.442	0.415	0.337	0.497	0.495	0.279
	Median	0.414	0.402	0.324	0.486	0.460	0.201
AR_{Q1}	**Mean**	-9.825	2.203	-0.554	-2.622	-12.639	-25.925
	Median	-10.054	3.139	-4.313	-3.887	-15.585	-29.943
Country		ES	FI	FR	GB	GR	HK
	N	70	40	155	450	24	208
ES score	**Mean**	0.644	0.639	0.626	0.433	0.428	0.467
	Median	0.716	0.703	0.680	0.396	0.433	0.468
ESG score	**Mean**	0.599	0.594	0.582	0.456	0.450	0.481
	Median	0.651	0.607	0.632	0.457	0.435	0.485
AR_{Q1}	**Mean**	-1.904	0.093	-1.989	-.952	8.719	-1.888
	Median	-4.891	-0.999	-3.440	0.255	8.403	-1.604
Country		ID	IE	IL	IN	IT	JP
	N	39	18	17	112	95	436
ES score	**Mean**	0.428	0.429	0.384	0.489	0.556	0.457
	Median	0.374	0.381	0.307	0.476	0.563	0.489
ESG score	**Mean**	0.447	0.446	0.387	0.494	0.541	0.468
	Median	0.398	0.434	0.406	0.499	0.547	0.491
AR_{Q1}	**Mean**	0.751	-5.504	-1.765	1.322	0.056	-1.476
	Median	3.273	-6.449	-1.085	-0.815	0.320	-1.403

Country		KR	MX	MY	NL	NO	NZ
	N	125	44	57	57	63	58
ES score	**Mean**	0.448	0.458	0.494	0.585	0.457	0.304
	Median	0.506	0.499	0.519	0.607	0.471	0.241
ESG score	**Mean**	0.463	0.476	0.493	0.569	0.463	0.364
	Median	0.516	0.490	0.519	0.596	0.442	0.340
AR_{Q1}	**Mean**	-6.656	-5.197	-7.365	-6.870	-10.408	-12.542
	Median	-7.912	-2.252	-3.669	-5.710	-10.632	-12.998
Country		OM	PE	PH	PL	PT	QA
	N	10	29	25	39	15	17
ES score	**Mean**	0.133	0.230	0.418	0.404	0.621	0.136
	Median	0.091	0.182	0.381	0.381	0.656	0.075
ESG score	**Mean**	0.242	0.314	0.441	0.432	0.579	0.245
	Median	0.191	0.303	0.430	0.460	0.598	0.201
AR_{Q1}	**Mean**	3.845	8.317	0.572	-1.189	-5.037	0.001
	Median	2.760	6.558	-0.857	-2.347	-10.34	3.952
Country		RU	SA	SE	SG	TH	TR
	N	41	33	128	44	44	51
ES score	**Mean**	0.410	0.168	0.481	0.468	0.588	0.513
	Median	0.432	0.097	0.459	0.487	0.658	0.565
ESG score	**Mean**	0.439	0.267	0.486	0.463	0.560	0.505
	Median	0.434	0.241	0.487	0.505	0.599	0.536
AR_{Q1}	**Mean**	4.499	-0.576	-6.042	-5.850	-1.657	0.765
	Median	0.543	-1.406	-6.877	-4.896	-7.465	1.017
Country		TW	US	ZA			
	N	145	2421	127			
ES score	**Mean**	0.509	0.306	0.471			
	Median	0.527	0.226	0.476			
ESG score	**Mean**	0.503	0.364	0.481			
	Median	0.517	0.318	0.489			
AR_{Q1}	**Mean**	-0.940	-9.551	-4.751			
	Median	-1.989	-10.539	-3.872			

Appendix E: Summary statistics by industry

This table shows summary statistics for the full sample (N=6,824) by industry. 2020:Q1 abnormal returns (AR_{Q1}) are winsorized at the 1st and 99th percentile in the cross-section. Appendix B provides a detailed variable description. Market and financial data are from Thomson Reuters' Datastream/Worldscope, and ESG data are from Thomson Reuters' Refinitiv ESG Database.

Industry		*1*	*2*	*3*	*4*	*5*	*6*
	N	18	12	9	1	2	195
ES score	**Mean**	0.388	0.294	0.459	0.355	0.306	0.361
	Median	0.390	0.281	0.457	0.355	0.306	0.313
ESG score	**Mean**	0.392	0.355	0.483	0.446	0.345	0.404
	Median	0.423	0.299	0.492	0.446	0.345	0.396
AR_{Q1}	**Mean**	0.344	3.407	−9.599	−24.662	1.147	6.019
	Median	−4.117	−2.483	−12.486	−24.662	1.147	5.585
Industry		*7*	*8*	*9*	*10*	*11*	*12*
	N	32	192	23	182	71	12
ES score	**Mean**	0.395	0.335	0.321	0.433	0.461	0.257
	Median	0.383	0.293	0.277	0.417	0.423	0.248
ESG score	**Mean**	0.414	0.390	0.390	0.450	0.470	0.349
	Median	0.386	0.373	0.378	0.436	0.415	0.377
AR_{Q1}	**Mean**	−0.756	−17.672	−10.300	−3.640	−2.668	−12.282
	Median	−3.280	−22.269	−9.618	−3.824	−2.046	−12.499
Industry		*13*	*14*	*15*	*16*	*17*	*18*
	N	210	16	17	34	27	16
ES score	**Mean**	0.463	0.538	0.394	0.446	0.387	0.361
	Median	0.461	0.662	0.320	0.452	0.331	0.283
ESG score	**Mean**	0.474	0.562	0.415	0.450	0.436	0.415
	Median	0.494	0.635	0.386	0.458	0.411	0.386
AR_{Q1}	**Mean**	0.618	−3.088	−13.239	−16.531	−8.875	−20.579
	Median	−0.532	−2.727	−11.235	−16.939	−7.766	−22.530
Industry		*19*	*20*	*21*	*22*	*23*	*24*
	N	53	48	510	54	50	18
ES score	**Mean**	0.530	0.366	0.397	0.578	0.474	0.446
	Median	0.563	0.292	0.346	0.601	0.487	0.462
ESG score	**Mean**	0.544	0.400	0.427	0.582	0.483	0.435
	Median	0.543	0.377	0.386	0.623	0.484	0.418
AR_{Q1}	**Mean**	0.083	−10.539	4.611	−13.964	−8.910	−24.828
	Median	0.902	−5.363	3.422	−13.811	−6.926	−24.597
Industry		*25*	*26*	*27*	*28*	*29*	*30*
	N	69	125	77	239	319	197
ES score	**Mean**	0.447	0.453	0.353	0.449	0.443	0.445
	Median	0.424	0.482	0.282	0.452	0.420	0.446
ESG score	**Mean**	0.469	0.466	0.386	0.462	0.461	0.468
	Median	0.451	0.492	0.341	0.456	0.454	0.467
AR_{Q1}	**Mean**	−2.176	−1.779	−3.536	−4.156	−0.027	−10.139
	Median	−2.254	−4.277	−3.705	−3.592	−0.820	−8.769
Industry		*31*	*32*	*33*	*34*	*35*	*36*
	N	212	22	21	18	54	4
ES score	**Mean**	0.366	0.437	0.462	0.296	0.408	0.715
	Median	0.335	0.474	0.483	0.284	0.405	0.685
ESG score	**Mean**	0.409	0.475	0.475	0.326	0.449	0.713
	Median	0.359	0.486	0.532	0.293	0.446	0.707
AR_{Q1}	**Mean**	0.340	−9.520	−1.388	−10.568	−1.749	4.178
	Median	0.960	−12.465	−3.440	−10.233	−4.271	−1.427

Industry		*37*	*38*	*39*	*40*	*41*	*42*
	N	74	76	5	29	203	282
ES score	**Mean**	0.373	0.461	0.423	0.368	0.392	0.458
	Median	0.346	0.523	0.484	0.352	0.370	0.453
ESG score	**Mean**	0.400	0.486	0.445	0.405	0.432	0.481
	Median	0.391	0.533	0.519	0.386	0.402	0.477
AR_{Q1}	**Mean**	-9.695	-18.478	-25.696	-11.990	-0.471	-3.524
	Median	-7.404	-21.832	-24.275	-16.536	0.717	-2.469
Industry		*43*	*44*	*45*	*46*	*47*	*48*
	N	87	82	13	58	58	31
ES score	**Mean**	0.303	0.339	0.570	0.420	0.493	0.264
	Median	0.245	0.333	0.669	0.410	0.510	0.221
ESG score	**Mean**	0.367	0.398	0.570	0.454	0.501	0.337
	Median	0.346	0.391	0.641	0.464	0.486	0.347
AR_{Q1}	**Mean**	-6.526	-1.622	-0.357	-9.717	4.731	-17.068
	Median	-8.237	-1.525	-0.630	-11.514	5.474	-20.131
Industry		*49*	*50*	*51*	*52*	*53*	*54*
	N	55	34	62	75	524	68
ES score	**Mean**	0.409	0.342	0.415	0.320	0.352	0.248
	Median	0.343	0.303	0.396	0.262	0.231	0.197
ESG score	**Mean**	0.446	0.396	0.448	0.355	0.406	0.324
	Median	0.394	0.382	0.426	0.306	0.334	0.328
AR_{Q1}	**Mean**	-28.614	-17.912	-27.022	-1.424	-8.783	-13.375
	Median	-29.885	-21.353	-27.046	-3.111	-9.300	-10.251
Industry		*55*	*56*	*57*	*58*	*59*	*60*
	N	190	191	15	267	224	54
ES score	**Mean**	0.358	0.381	0.219	0.404	0.325	0.474
	Median	0.302	0.319	0.178	0.359	0.257	0.521
ESG score	**Mean**	0.396	0.437	0.340	0.414	0.361	0.470
	Median	0.362	0.400	0.365	0.392	0.316	0.534
AR_{Q1}	**Mean**	1.557	-8.531	-0.894	-10.940	-16.463	-18.746
	Median	1.292	-8.814	-4.272	-10.878	-12.418	-18.95
Industry		*61*	*62*	*63*	*64*	*65*	*66*
	N	13	532	23	7	18	40
ES score	**Mean**	0.276	0.301	0.293	0.348	0.190	0.301
	Median	0.194	0.239	0.257	0.251	0.145	0.263
ESG score	**Mean**	0.356	0.343	0.353	0.364	0.254	0.336
	Median	0.309	0.304	0.310	0.264	0.222	0.289
AR_{Q1}	**Mean**	-15.949	0.093	-15.124	-6.607	-18.313	-17.200
	Median	-17.570	0.069	-16.473	-5.431	-21.509	-17.414
Industry		*67*	*68*	*69*	*70*	*71*	*72*
	N	68	3	21	9	1	172
ES score	**Mean**	0.322	0.131	0.150	0.305	0.551	0.34
	Median	0.225	0.121	0.119	0.280	0.551	0.273
ESG score	**Mean**	0.377	0.314	0.272	0.406	0.568	0.363
	Median	0.331	0.328	0.275	0.348	0.568	0.320
AR_{Q1}	**Mean**	-5.492	22.011	-7.808	-17.171	22.988	0.016
	Median	-6.190	28.690	-7.358	-17.927	22.988	-0.320
Industry		*73*					
	N	1					
ES score	**Mean**	0.692					
	Median	0.692					
ESG score	**Mean**	0.676					
	Median	0.676					
AR_{Q1}	**Mean**	-39.289					
	Median	-39.289					

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