

The COVID-19 Pandemic: A Test of the Resilience of ESG Practices for Small-Cap Firms in the United States

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Abstract

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The COVID-19 pandemic has had severe consequences for economies across the globe, causing panic across economies and triggering high levels of uncertainty among investors. Small-cap equities absorbed enormous damage as a result. In the United States, the Russell 2000 dropped by 41.6%. ESG practices have often been found to offer downside risk protection in times of crisis due to their insurance function, and the evidence found in this paper is consistent with this view. This paper uses a sample of small-cap firms to examine this relationship at the start of the COVID-19 pandemic (11 March 2020) and at the end of the COVID-19 pandemic (8 November 2021). This study finds that small-cap firms with higher ESG ratings perform better than those with low ESG ratings in the pre-COVID-19 and post-COVID-19 periods. However, ESG ratings are found only to drive performance in the former period.

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I. Introduction

In recent years, the promotion of sustainable investment by social activists and policymakers has led to a considerable shift in resources to ESG (Environmental, Social, and Governance) initiatives in firms. In 2022, for example, Sustainable Investment Assets in the U.S. rose from \$3.7 trillion (US SIF, 2012) to \$8.4 trillion (US SIF, 2022) in just 10 years.

Larcker, Tayan, & Watts (2022a) identify the lack of a clear consensus on the purpose of ESG. One school of thought argues that ESG investment reduces long-term risk and generates greater future profits, and another argues that profitability and stakeholder maximization are in opposition to each other. Hence, resources must be diverted from investors to stakeholders to pursue societal interests. A third and more common school of thought argues that organizations should push Corporate Social Responsibility (CSR) and Sustainable Responsible Investing (SRI) because it is simply the right thing to do.

There is also sentiment to replace firm decision rules with maximizing shareholder welfare rather than shareholder wealth. Firms do not have information on their shareholders' ESG exposures and, therefore often face difficulty in pursuing ESG goals and maximizing shareholder welfare (Fama, 2021).

The academic literature has not provided clear-cut empirical support for ESG initiatives, for example, Le Maux & Le Saout (2004) studied the returns of ethical indexes in comparison to market benchmarks and found that sustainability indexes do not underperform market indexes, and even outperform them in some cases.

On the other hand, Belghitar, Clark, & Deshmukh (2014) show that there is nothing to be gained or lost from socially responsible investing, but a higher price is paid in investor utility. They

propose that risk-averse investors can earn higher returns by shorting the SRI index (Socially Responsible Investing Index) and using the returns to invest in a conventional index.

Rather than looking at the direct impact of ESG investments on performance, the recent strand of literature looks at how ESG investments serve as insurance over disruptive/crisis periods. The recent strand of literature demonstrates mixed results supporting the insurance role of CSR and ESG investments.

For example, Lins, Servaes, & Tamayo (2017) examined the performance of firms during the 2008-2009 financial crisis and found that firms with high CSR ratings benefitted from insurance against downside risk. Fiordelisi, Galloppo, & Lattanzio (2022) also provide evidence supporting the ability of social capital to act as insurance against the COVID-19 pandemic. On the other hand, Demers, Hendrikse, Joos, & Lev (2020) demonstrate that ESG investments did not provide immunity in the first quarter of the 2020 COVID-19 pandemic; rather firms' leverage, and cash positions are significantly associated with performance during the crisis period.

This paper aims to contribute to the literature in two ways. Firstly, we extend the literature on the insurance role of ESG during the COVID-19 pandemic in the context of small-cap firms. Much of the previous literature on ESG focuses on large-cap stocks; Small-cap stocks are seldom considered (Blitz, 2023; Beloskar & Rao, 2023). One of the reasons is the absence of ESG data for small-cap firms (Beloskar & Rao, 2023). To the best of our knowledge, this study provides the first evidence of ESG investments as insurance for small-cap firms.

The paper also pays close attention to the timing of the insurance effect. Most of the previous studies (Ding, Levine, Lin, & Xie, 2021; Hoang, Segbotangni, & Lahiani, 2021; Li, Feng, Pan, & Sohail, 2022; Cardillo, Bendinelli, & Torluccio, 2023) do not consider the true recovery period

when the COVID-19 pandemic officially ended. Only a few have looked at this relationship at the end of the pandemic (such as Bae, Ghoul, Gong, & Guedhami, 2021; Demers et.al, 2020); however, these studies were conducted without considering the multiple waves of the pandemic. This paper contributes to the existing literature by conducting a pre-COVID-19 study as of 11 March 2020 when WHO officially declared the COVID-19 crisis a pandemic (WHO, 2020), and a post-COVID-19 study as of 8th November 2021 when the U.S. officially declared international borders open (Elbaum, Nevin, & Ortiz, 2021) which covers all pandemic waves in the U.S. This study provides evidence that ESG investments are not significant for small-cap firms in the recovery period at the end of the COVID-19 pandemic.

The pre-COVID-19 sample (169 small-cap firms), and post-COVID-19 sample (159 small-cap firms) are made up of the constituents of the S&P 600 Index and iShares ESG Aware MSCI USA Small-Cap ETF. As the nature of this study is to understand how past performance affects firms on the respective event dates, 2019 annual data is used for the pre-COVID-19 study, and the third fiscal quarter of 2021 data is used for the post-COVID-19 study.

We show that small-cap firms with high ESG ratings performed relatively better than those with low ESG ratings particularly at the start of the pandemic. The regression analysis demonstrates that ESG ratings have a significant positive relationship with returns only at the start of the COVID-19 pandemic. Even though high ESG small-cap firms also performed better than their counterparts in the post-COVID-19 period, ESG ratings have an insignificant association with returns at the end of the pandemic. We find that financial performance drives recovery during the recovery period. The results suggest that even for small-cap firms, ESG investments only matter during the crisis period because of the resilience ESG investments provide. We also employ industry-fixed effects to confirm the validity of the results and find the same results.

The remainder of this paper is structured as follows; chapter 2 provides a detailed literature review, chapter 3 outlines the data and empirical approach followed by the results of the summary statistics and correlation matrix, chapter 4 provides a discussion of the results, and lastly, chapter 5 provides a summary and conclusion.

II. Literature Review

Several studies demonstrate ESG investments can induce resilience against crisis periods. For example, Lins et.al (2017) examine the performance of 1,673 nonfinancial firms during the 2008-2009 financial crisis and found that firms with high CSR ratings performed significantly better than firms with low CSR ratings.

Lins et.al (2017) suggest that these results support the interaction between social capital and returns, whereby trust is derived from high social capital which positively influences stock returns when markets suffer from negative shocks. They conclude that social capital can be considered an insurance policy when events that adversely affect stakeholder trust in firms occur.

Fiordelisi et.al (2022) study the early stages of the COVID-19 pandemic across 27 countries and provide evidence supporting the insurance role of ESG against systematic shocks. They demonstrate that the insurance role exists in countries outside the U.S. too, but the effectiveness of ESG depends on the legal origin and labor market rigidity.

Li et.al (2022) study a sample of 2188 Chinese listed firms to examine the impact of ESG on cumulative abnormal returns (CARs) during the COVID-19 pandemic and show evidence that ESG investments are positively associated with CARs. They demonstrate that ESG only has a positive relationship with firms with negative shocks, hence supporting the risk mitigation ability of ESG.

Engelhardt, Ekkenga, & Posch (2021) uses the median ESG rating of 1452 European firms to separate high ESG-rated firms from low ESG-rated firms in their analysis and demonstrate that high ESG-rated firms were associated with higher abnormal returns and lower volatility.

Similarly, Cardillo et.al (2023) study 1204 financial and non-financial firms across 15 European countries and find that firms with higher ESG scores showed higher returns, lower volatility, and high stock liquidity than those with lower ESG scores when COVID-19 confirmed cases and deaths were announced. They find that more sustainable firms have relatively better levels of cash holdings and liquid assets which help them absorb the negative shock better.

Ding et.al (2021) show that firms with high CSR investments/activities pre-2020 are more resilient to COVID-19 due to high corporate immunity, particularly in economies with social norms prioritizing CSR and ESG issues. They also find that firms in a better financial position pre-2020 were more resilient to COVID-19.

Beloskar & Rao (2023) also demonstrate similar results when considering a sample of 335 Indian firms, showing that firms with high ESG scores performed better during the COVID-19 pandemic. This result is consistent with the view that good ESG performance provides downside risk protection against crises. However, very few small-cap stocks are included in their sample, which further motivates our study..

Boldeanu, Clemente-Almendros, Tache, & Segui-Amortegui (2022) consider the influence of ESG pillars on the response of 98 public companies in the European utility sector to COVID-19 using an event study and multivariate regression methodology. The returns for traditional energy companies are found to have been influenced significantly by ESG scores, whereby companies with high environmental and social scores have relatively high significant CARs.

Hoang et.al (2021) conduct an empirical study of 344 European-listed firms and show that high ESG performance does not induce better performance, but firms with high ESG performance have lower volatility. They demonstrate that firms with high ESG performance experience reduced volatility and reduced the negative impact of only some factors during the pandemic such as size, news heat, and beta.

However, there have also been important studies on ESG which do not support the insurance role of ESG during crisis periods.

For example, Larcker et.al (2022a) identifies seven ‘myths’ associated with ESG. They conclude that the value ESG creates is unclear, since the evidence supporting it is mixed. Cornell & Shapiro (2021) also put forward that it is unclear how ESG creates value, although implicit claims¹ create the necessary link to create shareholder value.

Fama (2021) argues that firms with higher ESG ratings often have lower costs of capital, but, with lower expected returns. Similarly, Cornell (2021) infers that because ESG investing is given so much focus, it is unlikely to be mispriced; hence, high ESG rating stocks have hedging capabilities present with lower expected returns.

Belghitar et.al (2014) show that there is no gain or loss in socially responsible investing strategies. However, at higher moments of returns distribution (skewness and kurtosis), a risk-averse investor should prefer to invest in conventional indices.

Kaiser (2020) observes the opposite, whereby it is possible to identify undervalued firms to form ESG-integrated value portfolios with higher returns. This is possible because large groups of

¹ Implicit claims are defined by Cornell & Shapiro (2021) to include fair treatment of employees, the promise of continuing service to customers, and honest dealings, whereby firms create value by selling implicit claims for more than their cost.

market participants do not often account for ESG performance so stock prices do not fully incorporate this information.

Demers et.al (2020) study a sample of 1652 firms to test the resilience of ESG during the first quarter (Q1) of 2020. Using abnormal buy-and-hold returns, ESG is found to be significant only in the absence of control variables such as accounting-based measures, measures of financial performance, and intangible assets. They also conduct an Owen-Shapley decomposition and find that ESG contributed only 1% of the total explained variance in returns.

To the best of our knowledge, ESG and small-cap firms have never been examined, mainly due to a lack of data (Blitz, 2023; Beloskar & Roa, 2023), and this is a significant literature gap this study aims to fill. This study examines the behavior of small-cap firms with a high ESG score during the COVID-19 crisis, leading to the hypotheses developed below: *Hypothesis 1a (H1(a))* and *Hypothesis 1b (H1(b))*.

H1(a): Small-cap firms with high ESG ratings outperform those with low ESG ratings at the start of the COVID-19 pandemic.

H1(b): ESG ratings have a positive relationship with the returns of small-cap firms at the start of the COVID-19 pandemic.

Although most studies examine the role of ESG in the pre-crisis or during the crisis period, a few studies have examined this relationship in the post-crisis period. For example, Bae et.al (2021) examine the relationship between CSR activities and raw stock market returns in the pre-pandemic and post-crash recovery periods using a sample of 1750 U.S firms.

Bae et.al (2021) find no evidence that CSR affects returns and conclude that pre-crisis CSR activities do not provide insurance against the adverse effects of the COVID-19 pandemic. They

also study the relationship in the post-crash period and find no significant relationship between ESG and returns. When the effect of CSR across industries was examined, the same insignificance is found in all industries except consumer durables, chemical and allied products, business equipment, and healthcare.

Lins et.al (2017) show no difference in performance between high-CSR firms and low-CSR firms in the post-financial crisis period. They conclude that CSR only matters during crisis periods as it acts as insurance but does not have any benefits during normal periods.

Demers et.al (2020) also test the significance of ESG during the COVID-19 recovery period (April to June 2020) using a sample of 1628 firms and conclude that high ESG firms performed less well. Again, ESG is found to be significant only when it is the sole explanatory variable in the model, however, with a negative relationship in the recovery period. In the Owen-Shapley decomposition of the returns, ESG again contributed negligibly to the total explained variance.

These studies help motivate the hypotheses to be examined when studying the relationship between ESG ratings and small-cap firms at the end of the COVID-19 pandemic as shown below in *Hypothesis 2a (H2(a))* and *Hypothesis 2b (H2(b))*:

H2(a): Small-cap firms with high ESG ratings outperform those with low ESG ratings at the end of the COVID-19 pandemic.

H2(b): ESG ratings do not have a significant relationship with the returns of small-cap firms at the end of the COVID-19 pandemic.

III. Data and Empirical Approach

A. Sample Selection

This study uses constituents from the iShares ESG Aware MSCI USA Small-Cap ETF (Ticker: ESML) and the S&P 600 Small Cap Index (SML) as of 11th March 2020, when the World Health Organization (WHO) declared the COVID-19 pandemic (WHO, 2020) as the official start date of the COVID-19 pandemic. 8th November 2021 is when the United States opened its borders to international travelers (Elbaum et.al, 2021), and this is the event date used to signify the end of the COVID-19 pandemic to enable a post-COVID-19 analysis.

The SML index follows the performance of chosen small-cap firms in the U.S., and the ESML ETF consists of small-cap U.S. companies with favorable environmental, social, and governance (ESG) profiles.

Following the initial sample of 1237 small-cap firms, those with missing data on the FactSet platform on FTSE ESG ratings and financial data/ratios (Appendix A) were excluded and this resulted in a final sample size of 169 small-cap firms for the pre-COVID-19 sample. The same process was followed for the post-COVID-19 sample, resulting in 159 small-cap firms. As mentioned, a central issue concerning the study of small-cap equities is data availability given that few small-cap firms invest in sustainable practices and/or publish reports. This limitation led to relatively smaller sample sizes in this paper compared to previous literature.

As the study aims to understand how the performance prior to an event date affects the performance of small-cap firms, data from the latest period just before the event period is used in both studies. Annual FTSE ESG ratings and financial data/ratios are collected as of 2019 for the pre-COVID-19 study. For the post-COVID-19 study, the FTSE ESG ratings and financial data/ratios are

collected as per the end of the 3rd fiscal quarter of 2021 (30th September 2021), as it is the latest fiscal quarter before the event date of 8th November 2021.

A high-ESG sub-sample and low-ESG sub-sample is required to understand the difference in performance between high-ESG and low-ESG small-cap firms. Therefore, the cross-sectional average ESG rating of the full sample is used to separate high ESG and low ESG small caps.

Based on the pre-COVID-19 final sample, the cross-sectional average ESG rating of 2.49 (Table 2) is used to create two sub-samples, the high-ESG sub-sample is composed of small-cap firms with ESG ratings greater than the cross-sectional average (80 firms). The low-ESG sub-sample is composed of small-cap firms with ESG ratings lower than or equal to the cross-sectional average (89 firms).

The post-COVID-19 sub-samples are made up of 76 firms small-cap firms with ESG ratings higher than the cross-sectional average ESG rating of 2.61 (Table 2), and 83 small-cap firms with ESG ratings lower than or equal to the cross-sectional average ESG rating.

B. Variables

Appendix A summarizes the variables included in the regression. The dependent variable used in the regression analysis is the Mean Cumulative Abnormal Returns (CARs) for each firm during each event window ((-25, -1), (-5, +5), (0, 0), (0, +1), (+1, +5), (+1, +10), and (+1, +25)). The Mean Cumulative Abnormal Returns are collected when the 'Eventus Cross-Sectional Daily' event studies are conducted for the pre-COVID-19 sample as of 11 March 2020 and the post-COVID-19 sample as of 8 November 2021.

FTSE ESG ratings assigned by FTSE Russell (ESGRating) are the main independent variable. FTSE ESG ratings are an overall rating comprised of 300 indicators for 7200 securities (Larcker,

Pomorski, Tayan, & Watts, 2022b; FTSE Russell, 2023). ESG ratings are devised to help investors judge the ESG quality of a firm (Larcker et.al, 2022b) and are used as a measure of ESG investments in this study. A dummy variable (ESGDummy) is added to separate high ESG small-cap firms and low ESG small-cap firms in both samples using the average ESG rating of the full samples.

Control variables (Table 1) are also selected following the works of Lins et al. (2017), Demers et.al (2020), Engelhardt et.al (2021), Li et.al (2022), and Beloskar & Roa (2023). This study uses size (calculated as the log of total assets; Lnsize), free cash flow (FCF), net income margin (NIM)², return on assets (ROA), and cash (calculated as the log of cash holdings; LnCash). Industry fixed effects are also added and defined using 2-digit SIC codes adopted from the study by Engelhardt et.al (2021) and Demers et.al (2020).

C. Empirical Approach

The hypotheses are tested using an event study and OLS regression following suit to previous studies such as Lins et.al (2017), Engelhardt et.al (2021), Li et.al (2022), and Beloskar & Roa (2023).

The event study is used to test *hypothesis 1a (H1a)* and *hypothesis 2a (H2a)*. A market model event study is conducted using ‘Eventus Cross-Sectional Daily Event Study’ by importing 8-digit CUSIPs for the pre-COVID-19 sample of 169 firms and the post-COVID-19 sample of 159 firms.

The official announcement by the WHO (2020) declaring the pandemic and the news that the U.S. officially opened international borders (Elbaum et.al, 2021) were both released in the afternoon. To capture the full effect of each news release, this study focuses on using event windows starting

² Net Income Margin has been winsorized at the 0.5 and 0.95 levels due to outliers.

from event day +1, as by day +1 information regarding the events will be fully incorporated into the stock prices.

The timeline for the event studies is as follows; the estimation period is taken as (-255, -46) which also includes the date COVID-19 was first observed (Contessi & De Pace, 2021) and the period when COVID-19 began affecting global financial markets (Fahlenbrach, Rageth, & Stulz, 2021). An anticipation window of (-25, -1) is included to examine the performance of small-cap firms just days before the announcement. The event window (-5, +5) is also added, following the work of Li et.al (2022), alongside several event windows starting from day +1 to examine post-announcement performance. The following event windows are used in this study; (-25, -1), (-5,+5), (0, +1), (+1, +5), (+1, +10), and (+1, +25), with the event day as (0,0).

The main event windows of interest in the pre-COVID-19 study are (-25, -1) and (-5, +5) to test the insurance effect of ESG. In the post-COVID-19 study, we are mainly interested in the (0, +1), (+1, +5), (+1, +10), and (+1, +25), to understand the significance of ESG ratings in driving recovery.

Following the event study, the mean cumulative abnormal returns (CARs) for each event window of each individual firm in the pre-COVID-19 sample are used as the dependent variable in regression equation 1. Similarly, CARs for each event window of each individual firm are used as the dependent variable in regression equation 2 for the post-COVID-19 study. To validate the results, the same set of regression is also replicated while adjusting for industry-fixed effects. The regression models for each event window event study windows is used to test *hypothesis 1b* and *hypothesis 2b* (H2b).

$$\begin{aligned}
& CARWindow_{(i)_{precovid19}} \\
&= \alpha + ESGRating_{i_{precovid19}}\beta_1 + ESGDummy_{i_{precovid19}}\beta_2 \\
&+ LnSize_{i_{precovid19}}\beta_3 + FCF_{i_{precovid19}}\beta_4 + NIM_{i_{precovid19}}\beta_5 \\
&+ ROA_{i_{precovid19}}\beta_6 + LnCash_{i_{precovid19}}\beta_7 + \varepsilon_i
\end{aligned} \tag{1}$$

$$\begin{aligned}
& CARWindow_{(i)_{postcovid19}} \\
&= \alpha + ESGRating_{i_{postcovid19}}\beta_1 + ESGDummy_{i_{postcovid19}}\beta_2 \\
&+ LnSize_{i_{postcovid19}}\beta_3 + FCF_{i_{postcovid19}}\beta_4 + NIM_{i_{postcovid19}}\beta_5 \\
&+ ROA_{i_{postcovid19}}\beta_6 + LnCash_{i_{postcovid19}}\beta_7 + \varepsilon_i
\end{aligned} \tag{2}$$

As shown in Appendix A, the dependent variable used in all regressions is the CARs (Cumulative Abnormal Return) for event windows (-25, -1), (-5, +5), (0, 0), (0, +1), (+1, +5), (+1, +10), and (+1, +25) denoted by $CARWindow_{(i)}$.

The main dependent variable is the company's FTSE ESG rating denoted by $ESGRating_i$. $ESGDummy_i$ is a dummy variable which equals 1 for high-ESG firms and 0 for low-ESG firms. $LnSize_i$ denotes firm size as calculated by the natural logarithm of the total assets. FCF_i denotes free cash flow. NIM_i denotes the net income margin as another measure of profitability. ROA_i denotes the return on assets as a measure of profitability. $LnCash_i$ denotes cash holdings as calculated by the natural logarithm of cash whereby cash represents all cash items, on-hand and in-bank, that are readily available for use, including cash equivalents that can easily be converted into cash.

Furthermore, Industry fixed effects are also added, and described as 2-digit SIC industry codes, to conduct additional regressions to confirm the validity of our results.

D. Summary Statistics

Table 1 displays the descriptive summary statistics for the pre-COVID-19 full sample and sub-samples, and the post-COVID-19 full sample and sub-samples. The average market value for the pre-COVID-19 full sample is \$4141.45 million, comparatively lower than the average market value (\$8564.81 million) for the post-COVID-19 sample.

[Please Insert Table 1 about here]

The average CAR of the high ESG sub-sample is relatively higher than the average CARs of the low ESG sub-sample for all the event windows in the pre-COVID-19 samples (Table 1; Figure 1). This provides preliminary evidence that high-ESG firms performed relatively better than low-ESG firms at the start of the COVID-19 pandemic.

[Please insert Figure 1 about here]

In addition, the average CAR for the high ESG sub-sample is relatively higher than the mean CARs of the low ESG sub-sample for event windows in the post-COVID-19 samples (Table 1; figure 2) (-5, +5), (0, +1), (+1, +5), (+1, +10), and (+1,+25); and relatively lower only for event windows (-25, -1), and (0, 0).

[Please insert Figure 2 about here]

The average free cash flow (FCF), average net income margin (NIM), average return on assets (ROA), and average cash (LnCash) are higher for the pre-COVID-19 high-ESG sub-sample compared to the pre-COVID-19 low-ESG sub-sample. The same difference is present in the post-COVID-19 sub-samples as well. A preliminary supposition can be drawn from this comparison,

whereby higher returns in the high-ESG sub-samples pre-COVID-19 and post-COVID-19 may be driven by better financial performance among high-ESG firms rather than the possession of higher ESG ratings.

E. Pearson Correlation Matrix

Table 2 tabulates the correlation matrix for the pre-COVID-19 full sample and the post-COVID-19 full sample. The results show that the CARs of each window have a significant correlation with the immediate subsequent CARs, indicating that the performance of the previous period affects the performance of the next period (for example the correlation between CARs at (0, +1) is positively significant with CARs at (+1, +5)).

The results show that there is no statistically significant correlation between the CARs and ESG ratings in the pre-COVID-19 sample and in the post-COVID-19 sample. Similarly, neither sample has a significant correlation between the ESG Dummy and CARs. These results suggest that ESG investments have no significant association with firm performance.

It should be pointed out that these findings should be taken with caution as the Pearson Correlation Matrix does not account for the relationships between all variables.

[Please insert Table 2 about here]

IV. Results and Discussion

A. Event Study Results

The event study results help demonstrate *Hypothesis 1a (H1(a))* and *Hypothesis 2a (H2(a))*. Table 3 summarizes the event study results for the event dates 11 March 2020 (the start of the COVID-19 pandemic) and 8 November 2021 (the end of the COVID-19 pandemic) for the full samples and sub-samples.

[Please insert Table 3 about here]

In the event windows (-25, -1), (-5, +5), and (0, 0) at the start of the pandemic the full sample (Table 3, Panel A) results display significant negative mean CARs of -5.04%, -10.62%, and -0.36% respectively (statistically significant at the 1%, 1%, and 10% level respectively). Following the announcement was a slight recovery as the result for the event window (+1, +10) shows a positive mean CAR of 4.34% significant at the 1% level, but then again followed a significant negative mean CAR (-1.54%) in the 25-day period ((+1, +25)).

Panels B, C, and D of Table 3 show the results for the two sub-samples of high ESG rating firms and low ESG rating firms at the start of the COVID-19 pandemic. The results show that both sub-samples had significant negative mean CARs at the start of the COVID-19 pandemic, but there are crucial differences between the two sub-samples to note.

In the event window (-25, -1), both the high-ESG and low-ESG sub-samples show negative mean CARs of -4.89% and -5.18% respectively, statistically significant at the 5% level. Nonetheless, the high ESG rating sub-sample performed relatively better with a difference in mean CAR of 0.29 pp³. The same outperformance is present in the event window (-5, +5) by 3.38 pp between the high-ESG rating sub-sample and the low-ESG rating sub-sample (Table 3, Panel D). Even on event day, only the low-ESG rating sub-sample underperformed the market by -0.61%.

In the event windows following the announcement, in the 5-day event window following the event day ((+1, +5)), the high-ESG rating sub-sample had a significant negative mean CAR of -5.56% while the low-ESG rating sub-sample had a greater significant negative mean CAR of -8.49%. The

³ Note: The difference in mean CARs between the high ESG sub-sample and the low ESG sub-sample is simply calculated as the mathematical difference measured in pp (percentage points) between mean CARs such as: -4.89% minus -5.18% = 0.29%

10-day window ((+1, +10)) shows statistically significant CARs for both sub-samples at the 10% level, but the high-ESG rating outperforms its counterpart by 1.21 pp.

Even though both samples experienced significant negative mean CARs, firms with high-ESG ratings outperformed firms with low-ESG ratings at the start of the pandemic. The event study results as of 11 March 2020 provide evidence to conclude $H1(a)$ whereby small-cap firms with higher ESG ratings outperform those with relatively lower ESG ratings.

The results from the pre-COVID-19 event study align with previous papers (Lins et.al, 2017; Engelhardt et.al, 2021; Li et.al, 2022; Fiordelisi et.al, 2022; Beloskar & Rao, 2023) supporting the insurance effect of high-ESG firms. These results provide preliminary support for the insurance role of ESG investments even for small-cap firms.

Similar to the results from the pre-COVID-19 event study, the post-COVID-19 event study (Table 3, Panels E, F, and G) also provides affirming evidence that firms with high ESG ratings perform relatively better.

The results for the full sample in the post-COVID-19 study show significant mean CARs of -3.23% and 1.10% for the event windows (-25, -2) and (-5, +5) respectively. However, unlike the pre-COVID-19 study results, the post-COVID-19 results do not show significant results on (0, 0) and (0, +1) for the full sample, or either sub-sample.

Given that the plan to open international borders was announced the month prior in October (Shepardson, 2021), the significance in event windows (-25, -1) and the lack of significance in event windows (0, 0) and (0, +1) can be attributed to an anticipation effect as most of the information is incorporated into stock prices before the actual announcement.

In comparing the performance of the high ESG rating sub-sample and low ESG rating sub-sample in the pre-COVID-19 study there is still some indication that high-ESG firms performed better than low-ESG firms.

The results show that the high-ESG rating sub-sample underperforms the low-ESG rating sub-sample only in the event window $(-25, -1)$ by 2.76 pp. In the following event windows with significant results, the high-ESG firms perform better than the low-ESG firms by a significant magnitude. For example, the results for the event window $(-5, +5)$ show that high-ESG firms performed better than low-ESG firms by 1.13 pp (table 3, Panel H). The same significant difference exists in event windows $(+1, +5)$, $(+1, +10)$, and $(+1, +25)$ whereby the high-ESG sub-sample shows higher mean CARs by 1.05 pp, 1.40 pp, and 2.09 pp respectively.

The post-COVID-19 event study results provide evidence supporting $H2(a)$ given that the high ESG rating firms outperform low ESG rating firms in the event window $(-5, +5)$, $(+1, +5)$, $(+1, +25)$.

Despite the encouraging event study results, it is crucial to recognize that significant differences in performance between high-ESG firms and low-ESG firms in both studies could partly be attributed to superior financial health and performance. The summary statistics (Table 1) show that high ESG firms have higher free cash flows, net income margins, return on assets, and cash, which could have a greater influence than ESG on small cap returns.

B. Regression Results

The OLS regression analysis is used to test *hypothesis 1b* ($H1(b)$), and *hypothesis 2b* ($H2(b)$). Table 4 tabulates the results of the regression results for pre-COVID-19 (Panel A) and post-COVID-19 (Panel B) studies from Columns 1 to 7 for event windows $(-25, -1)$, $(-5, +5)$, $(0, 0)$, $(0,$

+1), (+1, +5), (+1, +10), and (+1, +25) respectively. Panel C and Panel D present the regression results for pre-COVID-19 and post-COVID-19 studies including industry fixed effects.

[Please insert Table 4 about here]

The results for pre-COVID-19 regression analysis (Table 4, Panel A) yield encouraging results. The ‘ESGRating’ variable is statistically significant at the 1% level with a positive estimate when using CARs from the event window (-25, -1) as the dependent variable (Table 4, Panel A, Column 1). The same relationship is present in the second regression variation (Table 4, Panel A, Column 2), whereby the ‘ESGRating’ is positive and significant in the event window (-5, +5) at the 10% level. However, the relationship deteriorates in the remainder of the variations (Table 4, Panel A, Columns 3, 4, 5, 6, 7), and ‘ESGRating’ is no longer significant. The ‘ESGDummy’ is also significant but negative at the 10% level in the event window (-25, -1). However, given the significance level, these findings should be interpreted with caution. The pre-COVID-19 results with industry fixed effects (Table 4, Panel C) also show a positive association with CARs in event windows (-25, -1) at the 10% significance level.

The results from the pre-COVID-19 regressions demonstrate a positive association between ESG ratings and the CARs of small-cap firms in consistency with evidence supporting the notion that high-ESG firms exhibit higher returns.

In the 10-day event window ((+1, +10)) following event day, ‘FCF’ and ‘ROA’ are statistically significant at the 5% level but surprisingly have a negative association with CARs. Only ‘NIM’ has a positive significant association in this event window. In the (+1, +25) event window, ‘NIM’ has a positive and significant association with the CARs, while ‘LnCash’ has a significantly negative association with the CARs.

A noteworthy result is that of ‘LnSize’, Size (LnSize) has a negative estimate in all pre-COVID-19 regression variations. This means the greater the value of total assets (as LnSize is a function of total assets) the lower its returns at the start of the pandemic. In contrast to previous studies (Li et.al, 2022), whereby the coefficient of Size has been typically positive as larger firms are more capable of protecting themselves against downside risk.

In summary, these results support *H1(b)* to conclude that ESG ratings positively influenced small-cap firms' performance at the start of the COVID-19 pandemic. The results suggest that ESG investments prior to the pandemic were crucial for small-cap firms to brace against the initial adverse effects of the pandemic, but not in the period after.

These findings align with previous works on the ESG insurance effect for large-cap firms as in studies by Li et.al (2022), Fiordelisi et.al (2022), and Beloskar & Roa (2023). This study is the first to provide evidence that the insurance effect from ESG investments is also present for small-cap firms. Whereby, small-cap firms with high ESG ratings possess social capital which acts as a form of insurance that improves the firms' resilience and provides downside risk protection against negative economic shocks such as the COVID-19 pandemic.

On the other hand, the post-COVID-19 regression variations (Table 4, Panel B) provide no support for the significance of ESG investments at the end of the crisis period. However, the results in Panel D when including industry fixed effects in the regression show that ‘ESGRating’ has a significant negative association on event day (0, 0), but only at the 10% level.

‘ESGRating’ is insignificant in every event window, supporting *H2(b)*. An explanation for this insignificance could be that adopting ESG goals in the recovery period would increase the

production costs for firms (Fama, 2021), therefore moving resources away from other areas that are important for recovery.

The post-COVID-19 results demonstrate the significance of financial ratios in the recovery period. 'ROA' has a significant positive association with CARs at the 5% level in the (+1, +5) event window, in the (+1, +5) event window at the 1% level, and in the (+1, +25) event window at the 1% level. Additionally, 'NIM' is also significant at the 1% level in the (+1, +10) event window, but has a negative association with CARs.

Unlike the pre-COVID-19 study, 'LnSize' in event windows has positive significant associations with CARs in the (+1, +10), which means higher total assets would result in higher returns, therefore larger firms have relatively higher returns in the recovery period.

In summary, the regression results demonstrate that ESG ratings were only useful during the start of COVID-19 due to their insurance function to sustain the initial adverse effects of the pandemic, but do not drive recovery in the post-COVID-19 period. In this period, recovery is driven by financial performance, in which larger firms often have the advantage as they possess greater resources to induce recovery.

V. Summary and Conclusion

The primary purpose of this study was to understand if the insurance role of ESG was present for small-cap firms at the start of the COVID-19 pandemic (11 March 2020), and whether ESG induced recovery for small-cap firms at the end of the COVID-19 pandemic (8 November 2021).

The event study results suggest that ESG investments can be employed as insurance in times of crisis even for small-cap firms, as firms with high ESG ratings performed relatively better than those with low ESG ratings, particularly at the start of the pandemic. The regression analysis

demonstrates that ESG ratings have a significant relationship with CARs only at the start of the COVID-19 pandemic. High ESG small-cap firms performed better than their counterparts at the end of the COVID-19 pandemic, but ESG ratings were found to play an insignificant role at the end of the pandemic. Firm performance drives recovery during this period.

The results of this paper lead to the conclusion that ESG investments for small-cap firms only matter during the crisis period as a form of resilience, in line with evidence provided in previous studies supporting the insurance effect for large-cap firms. But this study is the first to provide evidence that the insurance effect from ESG investments is also present for small-cap firms.

This paper offers a novel contribution to this line of literature as it studies the insurance role of ESG in a small-cap equities context at the start of the COVID-19 pandemic and at the end of the COVID-19 pandemic. There are several potential extensions following this study; an interesting avenue would be to include a measure for investor sentiment to understand whether investor sentiment is influenced by ESG ratings rather than financial or economic factors.

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VII. Appendix

Appendix A Variable Description

Variable Name	Description	Definition
Dependent Variable		
CARWindow (-25, -1)/ CARWindow (-5, +5)/ CARWindow (0, 0)/ CARWindow (0, +1)/ CARWindow (+1, +5)/ CARWindow (+1, +10)/ CARWindow (+1, +25)	Mean Cumulative Abnormal Return	Cumulative Abnormal Return is the sum of abnormal returns over a time period. This study uses CARs as on 11 March 2020 and 8 November 2021. The Individual firm CARs for the following event windows are used as a dependent variable: (-25,-1), (-5,+5), (0,0), (0, +1), (+1, +5), (+1, +10), and (+1, +25).
Independent Variables		
ESGRating	FTSE ESG Rating	Raw FTSE ESG Ratings as of year-end 2019 and third fiscal quarter 2021.
ESGDummy		A dummy variable to represent firms with ESG scores high or lower than the mean FTSE ESG Ratings of the total sample (2.49 for the pre-COVID-19 sample and 2.61 for the post-COVID-19 sample). The variable equals 1 if the ESG rating is above the mean and 0 otherwise.
Size	Ln(Total Assets)	Natural logarithm of Total Assets.
FCF	Free Cash Flow	Operating Cash Flow from Operations.
NIM	Net Income Margin	Net Income Margin is a measure of profitability that measures the percentage of profit earned relative to revenue. Net Income Margin has been winsorized at the 0.5 and 0.95 levels due to outliers.
ROA	Return on Assets	The ratio of net income to total assets is a measure of profitability.
LnCash	Ln(Cash Holdings)	Natural logarithm of Cash. Cash represents all cash items, on hand and in bank, that are readily available for use. This includes cash equivalents that can easily be converted into cash.

Table 1:
Descriptive Sample Statistics

Table 1 provides the mean, median, maximum, minimum, and number of observations for the pre-COVID-19 full sample in Panel A, the pre-COVID-19 high ESG rating sample in Panel B, the pre-COVID-19 low ESG rating sample in Panel C as of event date 11 March 2020. The same descriptive statistics are also provided for the post-COVID-19 full sample in Panel D, the post-COVID-19 high ESG rating sample in Panel E, and the post-COVID-19 low ESG rating sample in Panel F as of event date 8 November 2021. These statistics are reported for the Cumulative Abnormal Returns (CARs) for each event window including (-25,-1), (-5,+5), (0,0), (0, +1), (+1, +5), (+1, +10), and (+1, +25), ESG rating, ESGdummy, size (LnAssets), free cash flow, net income margin, return on assets, cash (LnCashholdings).

Variable	N	Mean	Median	Std Dev	Minimum	Maximum
Panel A: Pre-Covid 19 Full Sample						
CARs Window (-25,-1)	169	-0.0504	-0.0433	0.2015	-0.8287	0.6938
CARs Window (-5,+5)	169	-0.1062	-0.0564	0.3054	-1.0169	0.8126
CARs Window (0,0)	169	-0.0036	-0.0036	0.0394	-0.1313	0.0901
CARs Window (0,+1)	169	0.0157	0.0227	0.0978	-0.3078	0.2684
CARs Window (+1,+5)	169	-0.0710	-0.0244	0.2386	-0.8266	0.5255
CARs Window (+1,+10)	169	0.0434	0.0359	0.1340	-0.3005	0.4533
CARs Window (+1,+25)	169	-0.0154	-0.0272	0.1638	-0.5135	0.7935
Market Value (Million)	169	\$ 4,141.45	\$ 3,891.12	\$ 2,072.65	\$ 405.44	\$ 12,333.45
ESG Rating	169	2.49	2.40	0.64	1.20	3.90
ESG Dummy	169	0.47	0.00	0.50	0.00	1.00
LnSize	169	8.28	8.28	0.84	5.92	10.42
FCF	169	\$ 178.21	\$ 214.48	\$ 422.66	-\$ 3,446.85	\$ 1,179.95
NIM	169	-68.29	5.24	774.52	-9904.46	216.68
ROA	169	3.99	5.09	11.64	-67.57	27.34
LnCash	169	5.49	5.62	1.13	1.53	8.28
Panel B: Pre-Covid 19 High ESG Sub-Sample						
CARs Window (-25,-1)	80	-0.0489	-0.0438	0.2188	-0.8287	0.6938
CARs Window (-5,+5)	80	-0.0860	-0.0218	0.3056	-1.0169	0.8126
CARs Window (0,0)	80	-0.0007	-0.0037	0.0371	-0.1119	0.0901
CARs Window (0,+1)	80	0.0256	0.0286	0.0935	-0.3078	0.2542
CARs Window (+1,+5)	80	-0.0556	-0.0049	0.2346	-0.8258	0.5255
CARs Window (+1,+10)	80	0.0498	0.0201	0.1399	-0.2844	0.4095
CARs Window (+1,+25)	80	-0.0072	-0.0311	0.1794	-0.3253	0.7935
Market Value (Million)	80	\$ 3,930.75	\$ 3,782.88	\$ 1,971.75	\$ 490.17	\$ 9,168.21
ESG Rating	80	3.06	3.00	0.40	2.50	3.90
ESG Dummy	80	1.00	1.00	0.00	1.00	1.00
LnSize	80	8.44	8.47	0.83	6.76	10.18
FCF	80	\$ 231.54	\$ 238.53	\$ 328.25	-\$ 1,594.64	\$ 1,075.40
NIM	80	-21.73	5.34	201.91	-1767.49	43.80
ROA	80	4.51	5.95	11.13	-62.72	20.95
LnCash	80	5.68	5.79	1.18	1.53	8.28
Panel C: Pre-Covid 19 Low ESG Sub-Sample						
CARs Window (-25,-1)	89	-0.0518	-0.0416	0.1859	-0.8034	0.3335
CARs Window (-5,+5)	89	-0.1243	-0.0737	0.3058	-0.9395	0.3855
CARs Window (0,0)	89	-0.0061	-0.0003	0.0413	-0.1313	0.0765

CARs Window (0,+1)	89	0.0067	0.0197	0.1012	-0.2627	0.2684
CARs Window (+1,+5)	89	-0.0849	-0.0512	0.2427	-0.8266	0.4074
CARs Window (+1,+10)	89	0.0377	0.0488	0.1289	-0.3005	0.4533
CARs Window (+1,+25)	89	-0.0229	-0.0204	0.1490	-0.5135	0.2936
Market Value (Million)	89	\$ 4,330.84	\$ 4,019.04	\$ 2,152.78	\$ 405.44	\$ 12,333.45
ESG Rating	89	1.99	2.00	0.32	1.20	2.40
ESG Dummy	89	0.00	0.00	0.00	0.00	0.00
LnSize	89	8.13	8.14	0.83	5.92	10.42
FCF	89	\$ 130.27	\$ 184.40	\$ 489.30	-\$ 3,446.85	\$ 1,179.95
NIM	89	-110.13	4.73	1051.14	-9904.46	216.68
ROA	89	3.53	4.83	12.12	-67.57	27.34
LnCash	89	5.33	5.44	1.06	1.82	7.80
Panel D: Post-Covid 19 Full Sample						
CARs Window (-25,-1)	159	-0.0323	-0.0282	0.1101	-0.3742	0.4404
CARs Window (-5,+5)	159	0.0110	0.0158	0.0944	-0.2887	0.4411
CARs Window (0,0)		-0.0016	-0.0007	0.0359	-0.1829	0.2903
CARs Window (0,+1)	159	0.0049	0.0004	0.0589	-0.1891	0.4293
CARs Window (+1,+5)	159	0.0048	0.0049	0.0570	-0.2275	0.3534
CARs Window (+1,+10)	159	-0.0159	-0.0092	0.0755	-0.2898	0.2870
CARs Window (+1,+25)	159	-0.0369	-0.0299	0.1047	-0.3269	0.3027
Market Value (Million)	159	\$ 8,564.81	\$ 6,796.76	\$ 6,714.48	\$ 1,291.43	\$ 51,775.04
ESG Rating	159	2.61	2.60	0.57	1.40	4.50
ESG Dummy	159	0.48	0.00	0.50	0.00	1.00
LnSize	159	8.36	8.37	0.80	6.24	10.97
FCF	159	\$ 83.10	\$ 66.45	\$ 196.25	-\$ 594.00	\$ 1,341.00
NIM	159	-149.95	8.16	1385.84	-14998.43	45.12
ROA	159	5.49	6.24	10.14	-58.80	27.55
LnCash	159	5.84	5.95	1.16	0.00	8.31
Panel E: Post-Covid 19 High ESG Sub-Sample						
CARs Window (-25,-1)	76	-0.0467	-0.0471	0.1155	-0.3742	0.4404
CARs Window (-5,+5)	76	0.0169	0.0144	0.1029	-0.2887	0.4411
CARs Window (0,0)	76	-0.0017	-0.0025	0.0195	-0.0588	0.0473
CARs Window (0,+1)	76	0.0048	-0.0009	0.0593	-0.1891	0.4293
CARs Window (+1,+5)	76	0.0103	0.0115	0.0603	-0.2275	0.3534
CARs Window (+1,+10)	76	-0.0086	-0.0077	0.0671	-0.2519	0.2870
CARs Window (+1,+25)	76	-0.0260	-0.0168	0.0985	-0.2730	0.3027
Market Value (Million)	76	\$ 8,263.09	\$ 6,884.22	\$ 5,437.50	\$ 2,504.89	\$ 31,779.85
ESG Rating	76	3.11	3.00	0.36	2.70	4.50
ESG Dummy	76	1.00	1.00	0.00	1.00	1.00
LnSize	76	8.55	8.42	0.82	6.84	10.97
FCF	76	\$ 111.55	\$ 77.35	\$ 220.95	-\$ 226.08	\$ 1,341.00
NIM	76	7.57	9.68	19.80	-110.29	45.12
ROA	76	6.58	6.25	6.87	-18.84	27.55
LnCash	76	5.91	6.12	1.24	0.00	8.27
Panel F: Post-Covid 19 Low ESG Sub-Sample						
CARs Window (-25,-1)	83	-0.0191	-0.0154	0.1039	-0.3608	0.3024

CARs Window (-5,+5)	83	0.0056	0.0160	0.0862	-0.1740	0.3517
CARs Window (0,0)	83	-0.0015	-0.0005	0.0462	-0.1829	0.2903
CARs Window (0,+1)	83	0.0049	0.0038	0.0589	-0.1807	0.3893
CARs Window (+1,+5)	83	-0.0002	-0.0028	0.0536	-0.1419	0.2139
CARs Window (+1,+10)	83	-0.0226	-0.0149	0.0822	-0.2898	0.2506
CARs Window (+1,+25)	83	-0.0469	-0.0444	0.1096	-0.3269	0.2956
Market Value (Million)	83	\$ 8,841.10	\$ 6,796.76	\$ 7,724.35	\$ 1,291.43	\$ 51,775.04
ESG Rating	83	2.16	2.20	0.29	1.40	2.60
ESG Dummy	83	0.00	0.00	0.00	0.00	0.00
LnSize	83	8.19	8.07	0.76	6.24	10.20
FCF	83	\$ 57.05	\$ 61.80	\$ 167.70	-\$ 594.00	\$ 786.70
NIM	83	-294.18	6.65	1912.10	-14998.43	38.41
ROA	83	4.49	5.94	12.37	-58.80	24.18
LnCash	83	5.76	5.83	1.09	0.00	8.31

Table 2:

Pearson Correlation Matrix

Table 2 is the Pearson correlation matrix for the pre-COVID-19 full sample in Panel A and for the post-COVID-19 full sample in Panel B. The following variables are included in the correlation matrix; Cumulative Abnormal Returns (CARs) for each event window including (-25,-1), (-5,+5), (0,0), (0, +1), (+1, +5), (+1, +10), and (+1, +25), ESG rating, ESGdummy, size (LnAssets), free cash flow, net income margin, return on assets, cash (LnCashholdings). Prob > |r| under H0: Rho=0.

Panel A: Pre-COVID-19 Full Sample (N=169)														
	CARs Window (-25,-1)	CARs Window (-5,+5)	CARs Window (0,0)	CARs Window (0,+1)	CARs Window (+1,+5)	CARs Window (+1,+10)	CARs Window (+1,+25)	ESG Rating	ESG Dummy	LnSize	FCF	NIM	ROA	LnCash
CARs Window (-25,-1)	1													
CARs Window (-5,+5)	0.6020	1												
CARs Window (0,0)	0.2302	0.4851	1											
CARs Window (0,+1)	0.0026	<.0001	0.7898	1										
CARs Window (+1,+5)	0.2351	0.5867	0.3967	0.5772	1									
CARs Window (+1,+10)	0.0021	<.0001	<.0001	<.0001	<.0001	1								
CARs Window (+1,+25)	0.3296	0.9162	0.3967	0.5772	<.0001	<.0001	1							
ESG Rating	-0.0927	0.3147	0.2593	0.4805	0.4448	0.0067	0.03219	1						
ESG Dummy	0.2308	<.0001	0.0007	<.0001	<.0001	0.6513	0.0480	0.8310	1					
LnSize	0.1135	0.3726	0.1111	0.2207	0.4203	0.5353	0.0186	0.1791	0.0198	1				
FCF	0.1418	<.0001	0.1506	0.0039	<.0001	<.0001	0.1393	0.1200	0.2235	0.0941	1			
NIM	0.1061	0.1171	0.1046	0.1322	0.0840	0.0164	0.0709	0.1202	0.2235	0.1619	0.0355	1		
ROA	0.1699	0.1295	0.1761	0.0867	0.2774	0.1848	0.0333	0.9138	0.4604	0.0719	0.0355	0.5553	1	
LnCash	0.0072	0.0628	0.0686	0.0968	0.0616	0.1156	0.8175	0.984	0.5866	0.511	0.0002	<.0001	0.6743	1
	0.9265	0.417	0.3755	0.2104	0.426	0.5586	0.3776	0.0709	0.1202	0.2235	0.1619	0.0355	0.5553	0.6743
	-0.2801	-0.2707	-0.2356	-0.2627	-0.1608	-0.0229	-0.0683	0.1393	0.1200	0.2235	0.1619	0.0355	0.5553	0.6743
	0.0002	0.0004	0.002	0.0006	0.0367	0.7681	0.4513	0.0186	0.0198	1				
	-0.0431	0.0413	-0.0192	-0.0568	0.0520	-0.1843	-0.0683	0.1393	0.1200	0.2235	1			
	0.5776	0.594	0.8043	0.4633	0.5023	0.0164	0.3776	0.0709	0.1202	0.2235	0.1619	1		
	0.0190	0.0020	-0.0108	0.0244	0.0136	0.1025	0.1638	0.0084	0.0572	0.1388	0.1619	0.0355	1	
	0.8061	0.9791	0.8892	0.753	0.8608	0.1848	0.0333	0.9138	0.4604	0.0719	0.0355	0.5553	1	
	0.0231	0.0446	-0.0145	-0.0763	0.0308	-0.1215	0.0179	0.0016	0.0421	0.0509	0.2789	0.5553	0.6743	1
	0.766	0.5647	0.8513	0.3243	0.6907	0.1156	0.8175	0.984	0.5866	0.511	0.0002	<.0001	0.6743	1
	-0.0955	-0.1001	-0.0858	-0.0699	-0.0843	0.0546	-0.1502	0.2288	0.1549	0.3458	0.1566	0.0454	-0.0326	1
	0.2166	0.1956	0.2674	0.3665	0.2756	0.4808	0.0513	0.0028	0.0443	<.0001	0.042	0.5575	0.6743	1
Panel B: Post-COVID-19 Full Sample (N=159)														
	CARs Window (-25,-1)	CARs Window (-5,+5)	CARs Window (0,0)	CARs Window (0,+1)	CARs Window (+1,+5)	CARs Window (+1,+10)	CARs Window (+1,+25)	ESG Rating	ESG Dummy	LnSize	FCF	NIM	ROA	LnCash
CARs Window (-25,-1)	1													
CARs Window (-5,+5)	0.3044	1												

CARs	-0.2131	0.3052													
Window															
(0,0)	0.007	<.0001	1												
CARs	-0.0200	0.5460	0.7517												
Window															
(0,+1)	0.8029	<.0001	<.0001	1											
CARs	0.1324	0.7529	0.1607	0.5591											
Window															
(+1,+5)	0.0962	<.0001	0.043	<.0001	1										
CARs	0.2282	0.6589	0.1296	0.3905	0.8088										
Window															
(+1,+10)	0.0038	<.0001	0.1035	<.0001	<.0001	1									
CARs	-0.0057	0.4391	0.1190	0.2367	0.5170	0.6491									
Window															
(+1,+25)	0.9434	<.0001	0.1353	0.0027	<.0001	<.0001	1								
ESG	-0.0911	0.0515	-0.0680	-0.0472	0.1177	0.0978	0.1162								
Rating															
	0.2534	0.5189	0.3948	0.5544	0.1396	0.2202	0.1448	1							
ESG	-0.1260	0.0598	-0.0022	-0.0007	0.0919	0.0929	0.1001	0.8232							
Dummy															
	0.1136	0.4538	0.9782	0.9935	0.2492	0.2443	0.2093	<.0001	1						
LnSize	-0.1704	0.1554	0.0069	-0.0683	0.0279	0.1107	0.0911	0.2776	0.2245						
	0.0318	0.0505	0.9316	0.392	0.7272	0.1649	0.2537	0.0004	0.0044	1					
FCF	-0.1097	0.0096	0.1010	0.0315	-0.0012	0.0810	0.0425	0.1359	0.1392	0.3651					
	0.1686	0.9049	0.2052	0.6939	0.9886	0.3099	0.5946	0.0876	0.0802	<.0001	1				
NIM	-0.1932	0.0368	0.3586	0.2187	-0.0591	-0.0044	-0.0024	0.0438	0.1091	0.1446	0.1166				
	0.0147	0.6452	<.0001	0.0056	0.4596	0.9557	0.9766	0.5835	0.171	0.0691	0.1434	1			
ROA	0.1015	0.1079	0.1236	0.0733	0.0980	0.3045	0.1476	0.0683	0.1029	0.0627	0.2907	0.5710			
	0.2028	0.1757	0.1205	0.3584	0.219	<.0001	0.0633	0.3921	0.197	0.4323	0.0002	<.0001	1		
LnCash	-0.1772	0.0434	0.0222	-0.0074	0.0146	-0.0394	0.0314	0.1547	0.0654	0.2679	0.0196	-0.0143	-0.0569		
	0.0254	0.587	0.7816	0.9267	0.8549	0.6222	0.6946	0.0516	0.4125	0.0006	0.8067	0.8578	0.4759	1	

Table 3
Event Study Results

Table 3 shows the event study results with the full sample results at the start of the COVID-19 pandemic (11th March 2020) in Panel A, the high ESG rating sub-sample event study results in Panel B, the low ESG rating sub-sample event study results in Panel C, the difference between the High ESG rating sub-sample and Low ESG rating sub-sample for Mean CARs and Precision Weighted CAAR is shown in Panel D. The results for the end of the COVID-19 pandemic (8th November 2021) are shown with the full sample results in Panel E, the high ESG rating sub-sample event study results in Panel F, the low ESG rating sub-sample event study results in Panel G, and the difference between the High ESG rating sub-sample and Low ESG rating sub-sample for Mean CARs and Precision Weighted CAAR is shown in Panel H. The difference in mean CARs between the high ESG sub-sample and the low ESG sub-sample is calculated as the mathematical difference measured in pp (percentage points) between mean CARs such as: -4.89% minus -5.18% = 0.29%. The symbols \$, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively, using a generic one-tail test. The symbols (< or >) etc. correspond to \$, * and show the direction and significance of a generic one-tail generalized sign test.

Days	N	Mean Cumulative Abnormal Return	Precision Weighted CAAR	Positive:Negative	StdCsect Z	Generalized Sign Z
Pre-Covid 19 Event Study Results						
Panel A: Full Sample						
(-25,-1)	169	-5.04%	-4.48%	65:104<<	-3.783***	-2.947**
(-5,+5)	169	-10.62%	-10.33%	69:100<<	-4.369***	-2.331**
(0,0)	169	-0.36%	-0.55%	79:09	-1.806*	-0.793
(0,+1)	169	1.57%	0.56%	100:69>>	0.779	2.438
(+1,+5)	169	-7.10%	-7.57%	71:98<	-3.935***	-2.024*
(+1,+10)	169	4.34%	2.72%	108:61>>>	3.034**	3.669***
(+1,+25)	169	-1.54%	-2.22%	73:96<	-1.926*	-1.716*
Panel B: High ESG Rating Sample						
(-25,-1)	80	-4.89%	-4.74%	30:50<	-2.774**	-2.183*
(-5,+5)	80	-8.60%	-8.45%	36:44	-2.525**	-0.841
(0,0)	80	-0.07%	-0.33%	35:45	-0.780	-1.065
(0,+1)	80	2.56%	1.48%	50:30>	1.431\$	2.290*
(+1,+5)	80	-5.56%	-5.70%	37:43	-2.111*	-0.617
(+1,+10)	80	4.98%	2.70%	51:29>>	1.983*	2.513**
(+1,+25)	80	-0.72%	-2.05%	32:48<	-1.227	-1.735*
Panel C: Low ESG Rating Sample						
(-25,-1)	89	-5.18%	-4.24%	35:54<	-2.570**	-1.991*
(-5,+5)	89	-12.43%	-12.05%	33:56<<	-3.602***	-2.415**
(0,0)	89	-0.61%	-0.75%	44:45	-1.708*	-0.083
(0,+1)	89	0.67%	-0.28%	50:39	-0.277	1.189
(+1,+5)	89	-8.49%	-9.28%	34:55<	-3.392***	-2.203*
(+1,+10)	89	3.77%	2.74%	57:32>>	2.301*	2.673**
(+1,+25)	89	-2.29%	-2.37%	41:48	-1.484\$	-0.719
Panel D: Difference between the High ESG rating sub-sample and Low ESG Rating sub-sample for Mean CAR and Precision Weighted CAAR						
(-25,-1)		0.29%	-0.50%			

(-5,+5)		3.83%	3.60%			
(0,0)		0.54%	0.42%			
(0,+1)		1.89%	1.76%			
(+1,+5)		2.93%	3.58%			
(+1,+10)		1.21%	-0.04%			
(+1,+25)		1.57%	0.32%			
Post-Covid 19 Event Study Results						
Panel E: Full Sample						
(-25,-1)	159	-3.23%	-2.76%	62:97<<	-3.793***	-2.573**
(-5,+5)	159	1.10%	1.26%	101:58>>>	2.026*	3.614***
(0,0)	159	-0.16%	-0.20%	74:85	-1.078	-0.669
(0,+1)	159	0.49%	0.34%	83:76	1.035	0.758
(+1,+5)	159	0.48%	0.60%	87:72)	1.599\$	1.393*
(+1,+10)	159	-1.59%	-0.92%	63:96<<	-1.876*	-2.414**
(+1,+25)	159	-3.69%	-2.59%	56:103<<<	-3.631***	-3.525***
Panel F: High ESG Rating Sample						
(-25,-1)	76	-4.67%	-4.32%	24:52<<	-3.864***	-2.996**
(-5,+5)	76	1.69%	1.61%	47:29>	1.622\$	2.282*
(0,0)	76	-0.17%	-0.28%	35:41	-1.398\$	-0.472
(0,+1)	76	0.48%	0.30%	37:39	0.555	-0.013
(+1,+5)	76	1.03%	1.02%	47:29>	1.720*	2.282*
(+1,+10)	76	-0.86%	-0.53%	28:48<	-0.795*	-2.078*
(+1,+25)	76	-2.60%	-1.74%	30:46(	-1.701*	-1.619\$
Panel G: Low ESG Rating Sample						
(-25,-1)	83	-1.91%	-1.32%	38:45	-1.435\$	-0.695
(-5,+5)	83	0.56%	0.94%	54:29>>	1.213	2.818**
(0,0)	83	-0.15%	-0.13%	39:44	-0.426	-0.475
(0,+1)	83	0.49%	0.39%	46:37	0.944	1.062
(+1,+5)	83	-0.02%	0.21%	40:43	0.455	-0.256
(+1,+10)	83	-2.26%	-1.29%	35:48(	-1.850*	-1.353\$
(+1,+25)	83	-4.69%	-3.36%	26:57<<<	-3.401***	-3.329***
Panel H: Difference between the High ESG rating sub-sample and Low ESG rating sub-sample for Mean CAR and Precision Weighted CAAR						
(-25,-1)		-2.76%	-3.00%			
(-5,+5)		1.13%	0.67%			
(0,0)		-0.02%	-0.15%			
(0,+1)		-0.01%	-0.09%			
(+1,+5)		1.05%	0.81%			
(+1,+10)		1.40%	0.76%			
(+1,+25)		2.09%	1.62%			

Table 4

OLS Regression Results

Table 4 presents the regression estimates for the dependent variable, Cumulative Abnormal Returns (CARs) for each event window including (-25,-1), (-5,+5), (0,0), (0, +1), (+1, +5), (+1, +10), and (+1, +25) for the pre-COVID-19 full sample and sub-samples (11th March 2020 and for the post-COVID-19 full sample and sub-samples (8th November 2021). The pre-COVID-19 variables are collected as the annual financial data/ratios as of 2019, and the post-COVID-19 are collected as the 3rd fiscal quarter financial data/ratios as of 2021. ESGRating is the FTSE ESG ratings. ESGDummy is equal to 1 if the ESG rating is higher than the mean in the respective samples. LnSize is the size of the firm calculated as the natural logarithm of total assets. FCF is the free cash flow. NIM is the net income margin. ROA is the return on assets. LnCash is the natural logarithm of cash holdings. Panel A presents the results for the pre-COVID-19 regression using individual firm CARs, Panel B presents the results for the post-COVID-19 regression using individual firm CARs. Panel C presents the results for the pre-COVID-19 regressions including the industry fixed effects, and Panel D presents the results for the post-COVID-19 regression including industry fixed effects. The results for the event window (-25, -1) are presented in Column 1, (-5, +5) in Column 2, (0, 0) in Column 3, (0, +1) in Column 4, (+1, +5) in Column 5, (+1, +10) in Column 6, and (+1, +25) in Column 7. Parameter p-values are reported below the parameter values in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Pre-Covid-19 Regression Results							
Variable	(-25,-1)	(-5,+5)	(0,0)	(0,+1)	(+1,+5)	(+1,+10)	(+1,+25)
ESGRating	0.12026	0.12230	0.01203	0.03237	0.05255	-0.01882	0.01475
	0.0051***	0.0613*	0.1596	0.1190	0.3186	0.5134	0.6790
ESGDummy	-0.10117	-0.06018	-0.00340	-0.00419	-0.01150	0.03608	0.00977
	0.0612*	0.4652	0.7528	0.8728	0.8630	0.3229	0.8285
LnSize	-0.07114	-0.10533	-0.01185	-0.03495	-0.04784	-0.01075	-0.00814
	0.0003***	0.0004***	0.0023***	0.0002***	0.0442**	0.4061	0.6110
FCF	-0.00002	0.00003	0.00000	-0.00001	0.00003	-0.00006	-0.00002
	0.5214	0.6321	0.8756	0.6094	0.5066	0.0278**	0.4479
NIM	0.00002	0.00001	0.00000	0.00002	0.00001	0.00004	0.00005
	0.4446	0.8274	0.6629	0.1077	0.7741	0.0080***	0.0095***
ROA	0.00040	0.00105	-0.00007	-0.00110	0.00016	-0.00239	-0.00146
	0.8015	0.6652	0.8313	0.1578	0.9333	0.0276**	0.273
LnCash	-0.00639	-0.01312	-0.00128	-0.00134	-0.01351	0.01040	-0.02295
	0.6585	0.5535	0.6593	0.8490	0.4508	0.2893	0.0598*
Intercept	0.32544	0.55270	0.07376	0.24085	0.26805	0.12752	0.15026
	0.0525**	0.0318**	0.0289**	0.0035***	0.1961	0.2606	0.2842
Observations	169	169	169	169	169	169	169
Industry Fixed Effects	No	No	No	No	No	No	No
R-Squared	0.1298	0.1110	0.0806	0.1221	0.0465	0.0948	0.0715
Panel B: Post-Covid-19 Regression Results							
Variable	(-25,-1)	(-5,+5)	(0,0)	(0,+1)	(+1,+5)	(+1,+10)	(+1,+25)
ESGRating	0.01383	-0.00755	-0.00945	-0.00897	0.01089	0.00374	0.01282
	0.5937	0.7509	0.2649	0.5406	0.4480	0.8334	0.6256
ESGDummy	-0.03173	0.01128	0.00628	0.00790	0.00015	0.00506	0.00434
	0.2787	0.6743	0.5110	0.6326	0.9924	0.8007	0.8835
LnSize	-0.00467	0.02248	-0.00404	-0.00962	0.00255	0.01479	0.01196
	0.6938	0.0403**	0.2979	0.1528	0.6977	0.0705*	0.3207

	-0.00008	-0.00005	0.00002	0.00002	-0.00002	-0.00003	-0.00003
FCF	0.0880*	0.2588	0.1098	0.3832	0.4394	0.2924	0.5416
	-0.00003	-0.00001	0.00001	0.00001	-0.00001	-0.00002	-0.00001
NIM	0.0001***	0.4243	<0.0001	0.0042***	0.0673*	0.0016***	0.1315
	0.00385	0.00157	-0.00056	-0.00059	0.00119	0.00358	0.00244
ROA	0.0003***	0.1005	0.0964*	0.3109	0.0386**	<.0001***	0.0210***
	-0.01437	0.00047	0.00181	0.00170	-0.00006	-0.00410	0.00062
LnCash	0.0541**	0.9453	0.4555	0.6847	0.9883	0.4204	0.9339
	0.05096	-0.17065	0.04609	0.09813	-0.05069	-0.14707	-0.18880
Intercept	0.6168	0.0692*	0.1669	0.0895*	0.3689	0.0364**	0.0689*
Observations	159	159	159	159	159	159	159
Industry Fixed Effects	No	No	No	No	No	No	No
R-Squared	0.1665	0.0455	0.1642	0.0698	0.0457	0.1665	0.0518

Panel C: Pre-Covid-19 Regression Results Including Industry Fixed Effects

Variable	(-25,-1)	(-5,+5)	(0,0)	(0,+1)	(+1,+5)	(+1,+10)	(+1,+25)
	0.11162	0.16209	0.00525	0.03033	0.09779	0.00883	0.07866
ESGRating	0.0356**	0.0421**	0.5832	0.1511	0.1260	0.8035	0.0733*
	-0.08358	-0.05228	0.00952	0.01352	-0.02656	0.02800	-0.03155
ESGDummy	0.1766	0.5725	0.3965	0.5834	0.7214	0.5010	0.5371
	-0.02394	-0.07313	-0.01035	-0.03654	-0.04127	-0.01309	-0.00320
LnSize	0.3079	0.0396**	0.0165**	0.0002***	0.1470	0.4085	0.8691
	-0.00003	0.00010	0.00001	0.00002	0.00009	-0.00004	-0.00001
FCF	0.4804	0.1321	0.4067	0.2548	0.0656*	0.1696	0.7243
	0.00004	0.00002	0.000002	0.00002	0.00002	0.00004	0.00005
NIM	0.1193	0.4825	0.6228	0.0545**	0.5355	0.0096***	0.0109***
	0.00022	0.00119	-0.00001	-0.00079	0.00081	-0.00166	-0.00011
ROA	0.8958	0.6431	0.9684	0.2477	0.6967	0.1526	0.9370
	-0.03313	-0.03348	-0.00302	-0.00153	-0.02017	0.01483	-0.01940
LnCash	0.0749*	0.2294	0.3702	0.8357	0.3673	0.2356	0.2068
	0.22151	0.21062	0.07137	0.21978	0.07067	-0.08355	-0.12632
Intercept	0.3774	0.5761	0.1193	0.0299**	0.8155	0.6213	0.5434
Observations	169	169	169	169	169	169	169
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.4294	0.4389	0.5052	0.6124	0.4053	0.4119	0.4061

Panel D: Post-Covid-19 Regression Results Including Industry Fixed Effects

Variable	(-25,-1)	(-5,+5)	(0,0)	(0,+1)	(+1,+5)	(+1,+10)	(+1,+25)
	0.00480	-0.01586	-0.02013	-0.02187	0.01185	0.00898	0.01155
ESGRating	0.8853	0.6019	0.0808*	0.2557	0.5418	0.6882	0.7238
	-0.03340	0.00820	0.01448	0.01868	-0.00202	-0.00261	0.01059
ESGDummy	0.3475	0.8001	0.2367	0.3616	0.9222	0.9128	0.7611
	-0.01207	0.02745	-0.00255	-0.00395	0.00258	0.01404	0.01745
LnSize	0.4282	0.0500**	0.6164	0.6522	0.7707	0.1711	0.2440
	-0.00002	-0.00002	0.00004	0.00005	-0.00002	-0.00002	-0.00004
FCF	0.7388	0.6830	0.0626*	0.1585	0.5416	0.6980	0.4913
	-0.00003	-0.00001	0.00001	0.00001	-0.00001	-0.00002	-0.00001
NIM	0.0005***	0.2557	0.0006***	0.1308	0.0587*	0.0075***	0.2318

	0.00281	0.00108	-0.00037	-0.00028	0.00118	0.00283	0.00187
ROA	0.0251**	0.3399	0.3837	0.6932	0.1035	0.0009***	0.1264
	-0.01381	-0.01064	0.00214	0.00092	-0.00337	-0.00831	-0.00664
LnCash	0.1828	0.2600	0.5471	0.8767	0.5751	0.2320	0.5127
	0.18403	-0.11496	0.05033	0.07608	-0.00539	-0.06315	-0.10451
Intercept	0.2861	0.4646	0.3955	0.4434	0.9571	0.5849	0.5363
Observations	159	159	159	159	159	159	159
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.3538	0.2687	0.2819	0.2505	0.1808	0.3804	0.3113

Figure 1:

Difference in average CARs between High ESG firms Sub-Sample and Low ESG firms Sub-Sample pre-COVID-19.

Figure 1 graphs the difference in average CAR in each event window $(-25, -1)$, $(-5, +5)$, $(0, 0)$, $(0, +1)$, $(+1, +5)$, $(+1, +10)$, $(+1, +25)$ between the pre-COVID-19 high ESG firms' sub-sample and the pre-COVID-19 low ESG firms' sub-sample.

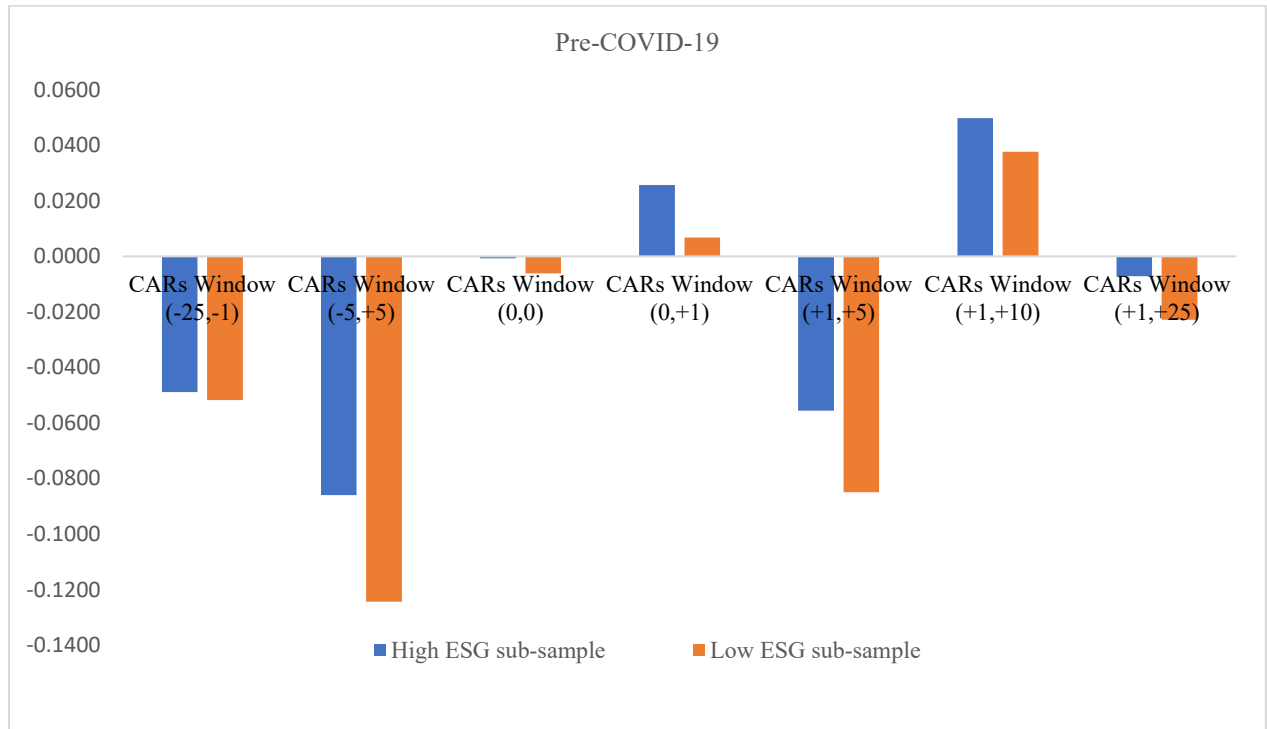


Figure 2:

Difference in average CARs between High ESG Sub-Sample and Low ESG Sub-Sample post-COVID-19.

Figure 2 graphs the difference in average CAR in each event window $(-25, -1)$, $(-5, +5)$, $(0, 0)$, $(0, +1)$, $(+1, +5)$, $(+1, +10)$, $(+1, +25)$ between the post-COVID-19 high ESG firms' sub-sample and the post-COVID-19 low ESG firms' sub-sample.

