

Bigger Fish to Fry: The Interdependence of Earnings and ESG News in Investor Screening

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Abstract

We examine how investors respond to concurrent financial and ESG performance news and the implications of their response for investor screening. Our analyses reveal that investors respond more strongly to ESG performance news during earnings announcement (EA) periods than non-EA periods. We also show that negative ESG performance news is typically more salient to investors, and that investors conduct negative screening based on this dimension. In contrast, investors do not screen on ESG performance news when earnings information is negative. Collectively, our results highlight the interdependence between investor use of information from different sources, and thereby contribute to a more complete understanding of the joint importance of financial and ESG performance information in evaluating investment alternatives.

JEL classification: M41, D83, G14, G32

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1. Introduction

We examine how investors respond to concurrent financial and ESG performance news and the implications of their response for investor screening. Within the ESG literature, there are studies that examine how firms' historical ESG performance influences capital market measures such as earnings informativeness (e.g., Cheng and Wahid, 2017; Berkovitch, Israeli, Rakshit and Sridharan, 2022) and how investors respond to new ESG performance information (e.g., Serafeim and Yoon, 2022a,b; Burzillo, Shaffer, and Sloan, 2022; Moss, Naughton, and Wang, 2022). However, neither of these two areas of literature have considered how investors respond to concurrent financial and ESG news. In the first area, the investor response to earnings information is conditioned on historical ESG performance. In the second area, studies have generally examined the investor response to new ESG performance information by isolating events that are separate from financial events (e.g., outside earnings announcements periods). While this research design choice allows for clean inferences on the effect of stand-alone ESG news, it limits our understanding of how investors respond to simultaneously provided financial and ESG performance information.

We propose that the concurrent processing of financial and ESG performance by investors warrants additional examination for two reasons. First, the investor response to ESG performance news that is separate from financial performance news does not provide a complete picture of how investors process ESG news, especially in the context of the practitioner view that ESG performance is a supplement rather than a substitute for financial performance.¹ For example, it is

¹ For example, in a recent CNBC interview discussing the inclusive, actively managed Vanguard Baillie Gifford Global Positive Impact Stock Fund, Matt Piro, Vanguard's global head of ESG, said "We absolutely think this positive impact fund is well done from an active standpoint because we want to deliver on both an outperformance objective while investing in those companies that contributed positively." Source: <https://www.cnbc.com/2022/07/28/impact-investing-opportunities-with-vanguard-despite-esg-concerns.html>

possible that ESG and financial performance information are interdependent, such that the former has implications for the interpretation of the latter. Second, the concurrent examination of financial and ESG performance may also provide insights into how investors screen across these dimensions. In general, screening is a process through which certain attributes are used to either include or exclude potential investments (e.g., tobacco companies). As part of the screening process, investors typically order their preferences according to desired attributes. For example, investors may use a positive screen to identify the acceptable set of high performing ESG firms and then take the step of selecting specific investments based on financial performance within that group.

We use earnings announcements to identify days where material financial performance information is revealed and data from Truvalue Labs (TVL) to identify days where material ESG performance information is revealed.² Our analyses measure the investor response using three short window market reaction variables commonly used in the literature: signed and absolute cumulative abnormal returns and share turnover. Broadly, these variables allow us to identify two distinct aspects of investor response. Cumulative abnormal return captures value implications (i.e., there was a change in the consensus view of the value of the firm), whereas absolute cumulative abnormal returns and share turnover capture the information content of the news (i.e., there was trading due to investors updating their prior assessment of the firm or disagreement among investors in their interpretation of the news).

We begin our empirical tests by establishing that there is a significant difference in how investors respond to ESG performance information on earnings announcement (EA) versus non-EA days across all three measures of investor response. We find a stronger response to ESG news

² The Truvalue Labs (TVL) data is described in detail in Section 3.1.

on EA days (the focus of our study) when compared to non-EA days (the focus of existing studies), suggesting that earnings announcement periods are a useful setting to understand how investors incorporate ESG information. The differential response also suggests that there is an interdependence among financial and ESG information. We find further support for this interdependence by documenting a differential response across EA and non-EA days for negative ESG performance but not for positive performance. Collectively, these findings are consistent with the notion that the interpretation of new financial information is influenced by new ESG information.

Next, we investigate whether there is evidence of investor screening across financial and ESG performance. Screening informs two facets of our research design. First, our tests filter on the attribute with the most salient signal (e.g., earnings in the case of financial performance) by using subsamples, and then investigate how investors respond to the second attribute (e.g., ESG performance) within each subsample. Second, since screening involves the differential inclusion and exclusion of firms based on “good” and “bad” attributes, our analyses focus on the differential response based on whether the earnings or ESG information is positive or negative. In other words, our inferences are driven by the differences across coefficients for “good” and “bad” attributes, rather than on single coefficient estimates.

Our analysis of the investor response to earnings and ESG performance during earnings announcement periods produces two key findings. First, there is no difference in the investor response to negative versus positive ESG information when earnings performance is negative. In other words, when a firm misses the consensus EPS forecast, there is no discernable difference in the market’s reaction between firms that also have concurrent negative or positive ESG news. In colloquial terms, this result implies that there is no evidence that investors care about new ESG

performance information when they have ‘bigger fish to fry’ in dealing with the negative earnings news. Second, when investors filter on earnings and that information is not negative, they do a subsequent negative screen based on the direction of ESG news. Specifically, our tests reveal a substantially larger response to negative ESG news compared to positive ESG news in the subsample of firms that do not miss the consensus EPS forecast. In other words, when there is not negative earnings news, investors negatively screen on negative ESG performance news.

Next, we find that the above results do not hold when we focus on the firm’s historical ESG performance as opposed to new ESG performance information. Across all specifications, there is no differential response to earnings news based on the firm’s historical ESG score. This finding implies that investors do not appear to screen based on the firm’s ESG type (i.e., the firm has a high versus a low aggregate ESG score) but rather on the firm’s ESG news. Our final analysis suggests that investors appear to screen based on past financial performance after filtering based on ESG news. We find consistent empirical evidence that the response to new ESG performance information varies based on the firm’s historical financial performance. This finding is consistent with the idea that investors screen on financial performance after selecting an appropriate set of firms based on new ESG performance information, thus adding further support to our conclusion that financial and ESG performance information are interdependent.

We make several contributions to the literature. First, we call attention to the potential interdependence between investor evaluations of information from different sources (i.e., Beyer, Cohen, Lys, and Walther, 2010), and thereby contribute to a more complete understanding of the joint importance of financial and ESG performance information in investor screening. Our analyses reveal that negative ESG performance news is typically more salient to investors, and find evidence that investors conduct negative screening based on this dimension. We also show

the interdependence of earnings and ESG news by documenting that investors do not screen on ESG performance news when the earnings information is negative.

Second, we contribute to the literature that examines how ESG performance relates to the processing of financial information (e.g., Cheng and Wahid, 2017; Berkovitch et al., 2022). While these prior studies document differences in capital market consequences such as earnings informativeness or stock price discovery, we find that historical ESG performance matters much less than new ESG performance information when investors are trading around earnings announcements. In fact, we find that investors do not appear to incorporate historical information on the firm's ESG performance when responding to earnings news.

Lastly, we contribute to the literature that examines how investors respond to new ESG performance information by showing that the response varies based on whether the information is provided during EA versus non-EA periods. We show that the response during EA periods tends to be stronger, suggesting that the availability of salient financial information might help investors to become aware of, acquire, and integrate the new ESG performance information (i.e., Blankespoor, deHaan, Wertz, and Zhu, 2019; Blankespoor, deHaan, and Marinovic, 2020). Our finding also has implications for prior studies that have focused on the investor response to ESG news outside of earnings announcement periods.

We proceed as follows. Section 2 provides the literature review while Section 3 outlines our data collection and sample construction. We present our research design and results in Section 4, and then conclude in Section 5.

2. Literature Review

There is a broad literature that examines the connection between ESG and financial performance—a view typically captured by the phrase “doing well by doing good” (e.g., Plumlee,

Brown, Hayes, and Marshall, 2010; Dhaliwal, Li, Tsang, and Yang, 2011; Servaes and Tamayo, 2012; Lys, Naughton, and Wang, 2015; Naughton, Wang, and Yeung, 2019). The common goal of these studies is to understand whether current ESG performance has implications for future financial performance. For example, Servaes and Tamayo (2012) show that there is an association between current ESG performance and future firm value for high customer awareness firms. In general, these studies use annual measures of both ESG and financial performance and long sample periods to support their conclusions.

Two streams of literature have developed from these studies. In the first stream, there are studies that examine how overall ESG performance (typically proxied for using the MSCI ESG score) relates to the processing of financial information. For example, Bartov and Li (2017) show that higher ESG performance is associated with stronger earnings response coefficients and lower post-earnings announcement drifts. Similarly, Berkovitch et al. (2022) document differences in stock price discovery based on a firm's overall ESG performance (i.e., firms with higher ESG ratings command faster incorporation of earnings news into stock prices). In addition, Cheng and Wahid (2017) find that voluntary adoption of ESG reports is associated with higher earnings response coefficients in the periods subsequent to the adoption.

The second stream examines how investors respond to new ESG performance information. In each of these studies, the expectation is that preferences for ESG performance will generate trading volume and portfolio turnover in response to ESG disclosures. This expectation is important because it can give rise to investor clientele and base effects, which can affect firms' cost of capital and feed back into firms' future ESG activities (Christensen, Hail, and Leuz, 2021; Goldstein, Kopytov, Shen, and Xiang, 2022). These studies have been conducted using analytical, experimental, and empirical approaches. In the analytical literature, Friedman and Heinle (2016)

develop a model where stock prices are influenced by investor preferences for socially responsible activities. They show that these preferences operate independently of cash flow information. In experimental studies, Cheng, Green, and Ko (2015) and Martin and Moser (2016) both report evidence that participants in their experiments have preferences for firms that have better ESG performance.

In the empirical literature, several studies have used an event study methodology to examine how investors respond to new information about ESG performance. For example, Griffin and Sun (2013) document a positive stock price response to the voluntary disclosure of greenhouse gas (GHG) or carbon emissions information. Serafeim and Yoon (2022b) find a positive (negative) market reaction to positive (negative) ESG news. In contrast, Burzillo, Shaffer, and Sloan (2022) examine the stock market reaction to the release of corporate sustainability reports incorporating SASB metrics. Using a variety of approaches, they find little evidence that these reports provide decision-useful information to investors. Moss, Naughton, and Wang (2022) document broader investor responses to ESG disclosures, but they fail to find evidence that ESG disclosures inform retail investors' buy and sell decisions.

Neither of these two streams of literature examines how investors respond to concurrent ESG and financial news. In the first stream, the investor response to earnings information is conditioned on historical ESG performance rather than new information on ESG performance. In the second stream, studies have generally examined the investor response to new information about ESG performance separate from financial news, an approach that is typically accomplished by eliminating from the analyses ESG disclosures that occur during earnings announcement periods. While this research design choice allows for clean inferences on the effect of stand-alone ESG

disclosures, it does not provide insights into how investors respond to simultaneously provided ESG and financial news.

In this paper, we propose that the concurrent processing of ESG and financial performance information by investors warrants additional examination. Many practitioners view the incorporation of ESG information by investors as a supplement rather than a substitute for financial information. In other words, it is likely to be the case that investors jointly consider ESG and financial information when making trading decisions. If so, then a more complete understanding of how investors use ESG disclosure requires that we examine concurrently provided ESG and financial information. In addition, from a research design perspective, investors are likely to be the most attentive to newly disclosed information during periods when financial information is being provided, which could generate different conclusions as to the usefulness of ESG information to investors when compared to studies that only consider isolated ESG disclosures.

In essence, our study proposes to examine how investors respond to ESG performance information when they also receive financial performance information and whether there are certain situations where one type of information is not decision useful (e.g., the direction of ESG performance is irrelevant when the financial information is negative). In this respect, our analyses can be considered in the context of prior studies that examine how investors process ESG information in the context of macroeconomic conditions, such as the 2008 financial crisis and the more recent COVID-19 crisis (e.g., Lins, Servaes, and Tamayo, 2017; Demers, Hendrikse, Joos, and Lev, 2021; Glossner, Matos, Ramelli, and Wagner, 2022). Our study is distinguished by a focus on the release of firm-specific earnings information rather than macroeconomic shocks.

3. Data and Sample

3.1 Sample Construction

We use Truvalue Labs (TVL) data to obtain ESG information. This data covers the period January 2008 through July 2019. The reason for the end date is because TVL was acquired by FactSet, at which point data was no longer made freely available to academic researchers. The advantage of TVL data over other sources of ESG information (e.g., MSCI, Refinitive, etc.) is the frequency and coverage of the data. More specifically, unlike traditional ESG data sets that are focused on annual ratings and periodic corporate disclosure, TVL uses machine learning to find ESG-relevant articles from a variety of sources, including reports by analysts, various media, advocacy groups, and government regulators. TVL emphasizes that its measures focus on vetted, reputable, and credible sources that are likely to generate new information and insights for investors. TVL employs a proprietary system that uses natural language processing to interpret semantic content that allows for the classification of information according to degrees of positivity or negativity and uses this system to produce a daily Pulse score, which captures all current information about the firm's ESG performance. According to TVL, the change in the Pulse score captures new information (i.e., the Pulse score only changes when there is new information), and the score is specific to visible events about which the news articles are written.³

The TVL data consists of 18,736,379 firm-days covering the period from January 2008 to July 2019. We merge this sample with CRSP, resulting in 9,266,642 firm-days (5,279 unique firms). We then make several adjustments to filter the sample. First, we require firms to be traded on a US exchange (CRSP share codes 10, 11, 12) and have a share price of at least \$1 at the end of the prior quarter. Next, we exclude observations where the SIC code, change in TVL Pulse score

³ See Section 3.1 in Serafeim and Yoon (2022b) for a detailed description and interpretation of the TVL data.

or 3-day stock return are missing. We also eliminate observations that have missing values for any of the control variables listed in Appendix A. Lastly, we exclude observations that are missing earnings surprise on the earnings announcement days. After applying all of these filters, the sample contains 3,744 unique firms and 5,677,750 firm-days. There is one singleton in this data, which we exclude, resulting in a final sample that consists of 3,743 unique firms and 5,677,479 firm-days from January 2008 to July 2019.

3.2 Descriptive Statistics

The sample composition by year and by industry are provided in Table 1. Panel A shows that there is an increasing pattern in the number of firm-years through 2015, at which point the number of firm years remains roughly stable. The pattern in the number of firm-days is similar, with increases each year through 2015, and a roughly stable number of firm-days from that point forward. The number of firm-days in 2019 is close to 7/12 of the prior year, reflecting the fact that it contains 7 months of data. Panel B shows that SIC codes covering Manufacturing make up about 42.2 percent of the sample, which is consistent with the general distribution of firms across SIC codes.

Table 2 Panel A presents the descriptive statistics for the final sample. We use three short window market reaction variables commonly used in the literature to proxy for investor reaction: signed and absolute cumulative abnormal returns (*CAR* and *AbsCAR*) and *Turnover*. *CAR* is the cumulative market-adjusted return during trading days $[-1,1]$ multiplied by 100, *AbsCAR* is the absolute value of *CAR*, and *Turnover* is the average share turnover during trading days $[-1,1]$ multiplied by 100. Share turnover equals the number of shares traded divided by the number of shares outstanding. The descriptive statistics show that the mean is greater than the median for each of the three variables, consistent with a positively skewed distribution.

We use the change in daily TVL Pulse score (*ESGScore*) as a proxy for new ESG information. We create the binary variable *ESGNewsNeg* (*ESGNewsPos*) and set it equal to one if the change in the TVL Pulse score from the previous trading day is less than -5% (greater than 5%). We use the $\pm 5\%$ threshold to identify the most salient and material ESG news events, as they correspond to approximately the top/bottom quartile conditional on a change in *ESGScore*. The descriptive statistics reveal that these types of score changes occur on 1.6% and 1.7% of trading days, respectively. *LowESG* (*HighESG*) is an indicator variable that is set equal to one if the firm's average TVL Pulse score over the prior 365 days was in the bottom (top) 25% of all firms in the sample on that day. By construction, each of these variables has a mean of 0.25 and a standard deviation of 0.433. Lastly, *ESGScore* has a mean and median that are fairly close (mean = 0.531 and median = 0.515) indicating that there is only a slight positive skew, and the standard deviation is 0.210 while the first and third quartiles are 0.395 and 0.681, respectively, indicating that the *ESGScore* has a somewhat narrow distribution.

The summary information for the control variables is consistent with what is expected for a study that covers the largest publicly traded firms. In particular, firms tend to be large (the average market cap is approximately \$8.7 billion), have a strong analyst following (the average number of analysts is approximately 10), and have a very high percentage of institutional investors (on average, 71 percent of shares are held by institutional investors). In addition, the average market-to-book ratio of 3.073 is consistent with what is typical for the S&P 500 index. During our sample period, about 25.8 percent of reported earnings are negative.

Table 2 Panel B provides descriptive information on the differences in ESG variables across EA and non-EA days. The average percentage change in the *ESGScore* variable is about 0.570% on EA days compared with 0.645% on non-EA days, a difference that is not statistically

significant. There is also no difference in the average percentage change in the absolute value of *ESGScore* across EA and non-EA days. However, there are statistically significant differences in the occurrence of both material negative and positive ESG news on EA days when compared to non-EA days. Approximately 2.3 percent (2.2 percent) of material negative (positive) ESG News days coincide with EA days compared with only 1.6 percent (1.6 percent) for non-EA days. These findings suggest that material ESG information is more likely to be made available on EA days relative to non-EA days.

4. Research Design and Results

4.1 Overview

The goal of our empirical analyses is to provide insights into how investors use the combination of financial and nonfinancial information to screen investments. In general, screening is a process through which certain attributes are used to either include or exclude potential investments. For example, negative ESG screening would entail eliminating from consideration firms that are the worst performers on ESG dimensions, whereas positive ESG screening would limit consideration to firms that are the best performers on ESG dimensions. Investors will typically order their preference for financial and nonfinancial information as part of the screening process. For example, investors may use a positive screen to identify the acceptable set of high performing ESG companies and then take the step of selecting specific investments based on financial information. Alternatively, investors may select the initial set of investments based on financial performance and then take the step of negative screening to eliminate specific investments based on poor ESG performance.

The above discussion highlights two attributes that form the basis of our empirical tests. First, our tests will use subsamples that allow us to better understand investors' use of financial

and nonfinancial information. For example, one of our analyses uses subsamples based on earnings information to investigate the use of ESG information conditional on earnings. Second, our tests will separate “good” and “bad” information across both financial and nonfinancial measures. For example, we will separate ESG information into positive and negative and we will focus our analyses on understanding the differential response to positive versus negative information. This research design choice allows us to provide insights into whether investors are making choices based on differences in ESG information, consistent with screening. More specifically, to the extent that there is no difference in the use of positive and negative ESG information, we can conclude that there is no evidence that ESG information is part of a screening process.

Our tests proceed in three parts. First, we compare the investor response to ESG information across EA and non-EA days to identify potential differences in the use of ESG information during these periods. Second, we focus specifically on EA periods, and examine whether investors incorporate differences in ESG performance conditional on whether the firm meets or beats the consensus EPS forecast. These tests provide insights into the use of ESG information after first filtering on earnings. Third, we employ measures of firm type (e.g., past ESG performance) in lieu of measures of new information to establish whether our results are attributable to new information. These tests are important because they provide insights into whether investors are screening based on firm type or newly available information.

4.2 Investor Response to ESG News on EA versus Non-EA Days

Our first analysis compares how investors respond to ESG news on EA versus non-EA days and whether there are differences across positive or negative ESG news. We use the following specification separately on samples of EA days and non-EA days:

$$\begin{aligned}
INVESTOR_RESPONSE_{i,t} = & \alpha + \beta_1 ESGNewsNeg_{i,t} + \beta_2 ESGNewsPos_{i,t} + \sum_j \gamma_j Controls_{i,t} \\
& + Fixed\ Effects + \varepsilon_{i,t}
\end{aligned} \tag{1}$$

We measure *INVESTOR_RESPONSE* using three short window market reaction variables commonly used in the literature: signed and absolute cumulative abnormal returns (*CAR* and *AbsCAR*) and share turnover (*Turnover*). Each variable is described in Section 3.2 and Appendix A. As noted below, *Turnover* captures abnormal turnover in our specification because we include firm fixed effects. Broadly, these variables allow us to identify aspects of investor response. *CAR* captures value implications (i.e., there was a change in the consensus view of the value of the firm), whereas *AbsCAR* and *Turnover* capture the information content of the news (i.e., there was trading due to investors updating their prior assessment of the firm or disagreement among investors in their interpretation of the news). As described in Section 3.2, *ESGNewsNeg* (*ESGNewsPos*) are binary variables set equal to one if the change in the TVL Pulse score from the previous trading day is less than -5% (greater than 5%), which corresponds roughly to the bottom and top quartile of score changes.

We control for the firm's overall ESG Rating (*ESGScore*) because of the possibility that the investor response to new ESG information might vary based on the firm's current overall commitment to ESG. We also control for a comprehensive set of variables that are typically employed in specifications that assess differences in market responses around earnings periods (e.g., deHaan, Shevlin, and Thornock, 2015; deHaan, Madsen, and Piotroski, 2017). These variables, defined in Appendix A, include firm size (*Size*), the Market-to-book ratio (*M/B*), total debt divided by total assets (*Leverage*), quarterly sales growth (*SalesGrowth*), the number of analysts covering the firm (*Analysts*), the standard deviation of returns over the prior three months (*RetVol*), the percentage of shares held by institutional investors (*InstOwn*), earnings persistence

(*EarnPersist*), the number of days between the earnings announcement and fiscal quarter end (*ReportLag*), and an indicator for firms reporting negative earnings (*Loss*). We also include two sets of fixed effects, firm and date, to fully absorb time-invariant cross-firm heterogeneity and time trends.⁴

The results in Table 3 Panel A show that there are statistically significant differences between positive and negative ESG news on both EA and non-EA days. In Column (1), the coefficient estimate for negative ESG is -0.276 and for positive ESG is 0.063. The difference between these two coefficients is -0.339, and that difference is statistically significant (p -value = 0.097). This finding indicates that investors respond differently to positive versus negative ESG information, and more specifically, that the signed return response on EA days is lower for negative ESG information than it is for positive. The same coefficient difference for non-EA days is economically lower, with a difference between positive and negative ESG of only -0.037. However, that difference is also statistically significant (p -value = 0.018), indicating that the signed return response on non-EA days is lower for negative ESG information than it is for positive.

The coefficient estimate for *ESGNewsNeg* (*ESGNewsPos*) on EA Days is -0.276 (0.063) compared with 0.007 (0.044) on non-EA days. At the end of Table 3 Panel A, we report the p -values from an F -test that compares coefficients across columns. We find that the coefficients for *ESGNewsNeg* are statistically different across EA and Non-EA days, with a p -value of 0.048, but that there is no discernable difference across columns for *ESGNewsPos*. This finding suggests that the substantially greater difference in the response to positive versus negative ESG information on EA days is primarily attributable to differences in how investors respond to negative ESG

⁴ We obtain similar results when using industry fixed effects instead of firm fixed effects. We also confirm that our fixed effect structure is appropriate using the diagnostic procedures in deHaan (2021).

information on EA versus non-EA days. More specifically, the evidence collectively suggests that investors have a strong negative response to negative ESG information on EA days that is not replicated on non-EA days.

The results for *AbsCAR* and *Turnover* in Table 3 Panel B provide similar conclusions. More specifically, there is always a greater investor response to negative versus positive ESG news, and the difference in the response to negative versus positive ESG news is statistically significant. For example, in Column (3), the coefficient on *ESGNewsNeg* is 0.151 and the coefficient on *ESGNewsPos* is 0.078, representing a difference of 0.073. This difference is statistically significant with a p -value of 0.016. As with the results in Panel A, the difference in coefficients is much larger on EA days than on non-EA days. For example, while the difference in coefficients for the EA day specification in column (3) is 0.073, the difference in the non-EA day specification in column (4) is 0.012. The different magnitudes in the coefficient differences are once again attributable to differences in how investors respond to negative as opposed to positive news. The p -values of the F -tests that compare coefficients on *ESGNewsNeg* across columns are significant (p -value of 0.028 across columns (1) and (2); p -value of 0.001 across columns (3) and (4)), and the p -values of the tests that compare coefficients on *ESGNewsPos* across columns are insignificant (p -value of 0.899 across columns (1) and (2); p -value of 0.421 across columns (3) and (4)).

Collectively, the results in Table 3 provide strong evidence that investors process ESG news differently on EA versus non-EA days. In addition, the evidence indicates that the investor response is stronger on EA days, and this stronger response is primarily attributable to the much stronger response to negative ESG news. We find consistent differences in both signed and unsigned returns, as well as trading volume. We interpret these findings as evidence that there is an interdependence among financial and ESG information. This finding is notable as a common

method of investigating the importance of ESG disclosures involves excluding those information events that happen in the period surrounding earnings announcements. This research design choice is made because of the concern that the known investor response to earnings will contaminate inferences about the investor response to ESG news. Our results suggest that this research design choice may be detrimental in certain circumstances, as the availability of salient financial information might help investors to become aware of, acquire, and integrate the new ESG performance information.

4.3 Investor Screening of Earnings and ESG News on EA Days

We investigate whether investors screen on earnings and ESG information by examining how the investor response to salient earnings information (i.e., whether or not the company missed the consensus analyst forecast) varies based on concurrently released ESG information. We use the following specification for only the sample of EA days:

$$\begin{aligned} INVESTOR_RESPONSE_{i,t} = & \alpha + \beta_1 ESGNewsNeg_{i,t} + \beta_2 ESGNewsPos_{i,t} + \sum_j \gamma_j Controls_{i,t} \\ & + Fixed\ Effects + \varepsilon_{i,t} \end{aligned} \quad (2)$$

As with equation (1), we measure *INVESTOR_RESPONSE* using three short window market reaction variables: signed and absolute cumulative abnormal returns (*CAR* and *AbsCAR*) and *Turnover*. *ESGNewsNeg* and *ESGNewsPos* are defined as before. We also include the absolute value of earnings surprise (*AbsSurp*) to capture the possibility of a differential impact of larger earnings surprises, the same control variables as equation (1), and continue to use two sets of fixed effects, firm and date, to fully absorb time-invariant cross-firm heterogeneity and time trends. As previously noted, the specification using *Turnover* captures abnormal turnover in our specification because of firm fixed effects. We estimate equation (2) across two subsamples: the subsample of EA days where the firm missed the analysts' consensus EPS forecast (i.e., *MissEst* = 1) and the

subsample of EA days where the firm met or beat the analysts' consensus EPS forecast (i.e., $MissEst = 0$).

There are two notable results in Table 4. First, there is no difference in the investor response to negative or positive ESG information when earnings news is negative. In Panel A, the coefficients in column (1) are -0.189 (t -statistic -0.68) and 0.198 (t -statistic 0.72) for negative and positive ESG news, respectively for the subsample where $MissEst = 1$. The difference between these coefficients is insignificant, with a p -value of 0.308. This result means that when a firm misses its consensus EPS forecast, the signed market return response does not vary based on concurrent positive or negative ESG news. The results in Panel B Columns (1) and (3) provide similar conclusions. There is no difference in $AbsCAR$ nor $Turnover$ for negative versus positive ESG information (p -values of the test of the difference in the coefficients in Panel B are 0.866 and 0.306, respectively). These results mean that when a firm misses its consensus EPS forecast, the absolute market return response and turnover do not vary based on concurrent positive or negative ESG news. We interpret these results as implying that investors do not consider the nature of ESG news when they are responding to a negative earnings event. From a screening perspective, this implies that investors disregard ESG news when earnings news is negative, and that negative earnings news alone directs the outcome of the investor screening process.

Second, investors who first filter on earnings primarily care about negative ESG performance when the earnings information is not negative. In Panel A Column (2), the coefficient on $ESGNewsNeg$ is significantly negative and the coefficient on $ESGNewsPos$ is insignificant. More importantly, the difference between these two coefficients is statistically significant (p -value = 0.08). The results for $AbsCAR$ and $Turnover$ in Panel B provide similar inferences. In Columns (2) and (4), the difference in the coefficients for $ESGNewsNeg$ and $ESGNewsPos$ are statistically

significant, with p -values of 0.043 and 0.050, respectively. Across Panels A and B, there is a differential negative signed return response, a differential absolute return response, and a positive difference in turnover for negative ESG news relative to positive ESG information. In each case, these results suggest that negative ESG news is important to investors when earnings news is not negative. In other words, when investors filter on earnings and that news is not negative, they do a subsequent screen based on whether the ESG is positive or negative.

4.4 Investor Screening on EA Days using ESG Score

Next, we shift to see what additional insights can be gained through analyses that include proxies for firm type (i.e., firms that have a certain level of ESG performance) rather than focusing solely on new performance information. We use the following specification, which follows from equation (2):

$$\begin{aligned} INVESTOR_RESPONSE_{i,t} = & \alpha + \beta_1 LowESG_{i,t} + \beta_2 HighESG_{i,t} + \sum \gamma_j Controls_{i,t} \\ & + Fixed\ Effects + \varepsilon_{i,t} \end{aligned} \quad (3)$$

As with equations (1) and (2), we measure $INVESTOR_RESPONSE$ using the same three short window market reaction variables. We also include the same control variables as equation (2) (except we exclude $ESGScore$ as discussed below) and continue to use firm fixed effects and date fixed effects. The difference between equation (3) and equation (2) is the use of $LowESG$ and $HighESG$ in lieu of the ESG news variables. $LowESG$ ($HighESG$) is an indicator variable that is set equal to one if the firm's average TVL Pulse score over the prior 365 days was in the bottom (top) 25% of all firms in the sample on that day. The intuition behind using $LowESG$ and $HighESG$ is that they capture the firms' "type" from an ESG perspective. The specification in equation (3) allows us to determine whether investors respond differently based on the firm's prior ESG performance. Again, we estimate equation (3) using the subsample of observations where the firm

missed the consensus EPS forecast (i.e., $MissEst = 1$) and the subsample of observations that did not (i.e., $MissEst = 0$)

Table 5 presents the results. The differences in the coefficients on *LowESG* and *HighESG* are insignificant in each specification in both Panels A and B. These results suggest that once an investor screens on earnings news, there is no differential response to earnings information based on whether the firm is high or low performing from an ESG standpoint. In other words, once investors screen based on earnings, we do not detect that there is additional screening based on firms' historical ESG performance. Across the six specifications, the p -values are not remotely close to standard levels of significance. We note that the result in Table 5 Panel A is inconsistent with the risk management theory that suggests ESG performance acts as a form of reputation insurance (Godfrey, 2005; Godfrey, Merrill, and Hansen, 2009; Minor and Morgan 2011), which would predict a differential response to *LowESG* and *HighESG* when $MissEst = 1$.

Overall, the results in Table 5 suggest that the firm's past ESG performance generates a weaker investor response than new ESG information. Broadly, when we compare Table 4 and Table 5, we conclude that new ESG information is substantially more important to investors than the firm's overall ESG performance. This is reassuring from a market efficiency standpoint, but it also has implications for studies of ESG disclosures more generally. The use of ESG scores that are updated quarterly or annually is a common feature of the literature, and the differences in our findings across Table 4 and Table 5 suggest that this common feature might be leading to different conclusions that would be obtained using a short-window measure of new ESG performance. In other words, inferences about how investors interpret earnings news in the presence of ESG information may be different if the ESG information is new (as in our Table 4) as opposed to stale (as in our Table 5).

4.5 Investor Screening on Historical Financial Performance on ESG News Days

Our final specification investigates the differential role of the firm's prior financial performance when investors filter first on material ESG news. In other words, we investigate whether investors respond differentially to ESG news events based on the firm's prior financial performance. The specification follows from equation (3) and is as follows:

$$\begin{aligned} INVESTOR_RESPONSE_{i,t} = & \alpha + \beta_1 LowReturn_{i,t} + \beta_2 HighReturn_{i,t} + \sum_j \gamma_j Controls_{i,t} \\ & + Fixed\ Effects + \varepsilon_{i,t} \end{aligned} \quad (4)$$

We estimate equation (4) using the subsample of observations where the firm had material negative ESG news (i.e., $ESGNewsNeg = 1$) and the subsample of observations where the firm had material positive ESG news (i.e., $ESGNewsPos = 1$). We measure $INVESTOR_RESPONSE$ using the same three short window market reaction variables, and include the same control variables and fixed effects as equation (3). The difference between equation (4) and equation (3) is the use of variables that capture firms' recent financial performance (i.e., $LowReturn$ and $HighReturn$) in lieu of variables that capture firms' past ESG performance. $LowReturn$ ($HighReturn$) is an indicator variable that is set equal to one if the firm's average market-adjusted return over the prior 365 days was in the bottom (top) 25% of all firms in the sample on that day. The intuition behind using $LowReturn$ and $HighReturn$ is that they capture the firm's "type" from a financial performance perspective. We use a relatively long 365 window to mitigate the concern about mean reversion in returns, which is pronounced over shorter windows.

Table 6 presents the results. The main takeaway is that financial type is important even when investors screen on ESG news. Across five of the six specifications, there is a statistically significant difference between the coefficients on $LowReturn$ and $HighReturn$. For example, in Panel B column (1), the coefficient on $LowReturn$ is 0.280 and the coefficient on $HighReturn$ is -

0.016, resulting in a difference in these coefficients of 0.296, which is significantly different from zero at the 1% level of significance. The findings provide an interesting complement to those in Table 4. In those analyses, we found that investors screening on earnings information only considered whether there was positive or negative ESG news if the earnings news was not negative. In other words, we found that investor screening was dominated by earnings news. In Table 6, we find that investors screening on ESG news always consider past financial performance. That is, they incorporate past financial performance when they screen on ESG news and the ESG news is either negative or positive.

There are a few interesting individual coefficients in Table 6 that do not inform our conclusions as we are concerned about differences between the coefficients on *LowReturn* and *HighReturn* rather than individual point estimates. For example, the coefficient on *LowReturn* is positive and the coefficient on *HighReturn* is negative in Panel A Column (2). These coefficients might ordinarily be a function of mean reversion, but we do not believe that to be the case in our specifications because of the long window over which we are aggregating prior returns.

Lastly, there is a related interpretation of Table 6 that aligns with the description of how ESG information is used in trading decisions by institutional investors (e.g., Vanguard). Specifically, the use of two subsamples based on positive and negative ESG performance information can be viewed as one way to identify available investments (i.e., an investor wants to include ESG performance as a first filter in its evaluation). In Table 6, we see that the difference in coefficients across *LowReturn* and *HighReturn* are informative to investors and generate a differential price response. These outcomes are consistent with investors first screening on ESG performance, and then selecting the final investment based on differences in financial performance.

5. Conclusion

Our findings have implications for the use of ESG performance information in investing decisions. We document a number of interdependencies across financial and ESG news. First, it appears that when investors first filter on earnings, there is no evidence that they incorporate differences in negative and positive ESG news when the firm misses the consensus EPS forecast. This finding suggests that screening on ESG information depends on the nature of the earnings news, an interdependency unexplored by prior studies. In contrast, when investors first filter on ESG news, they always incorporate information about the prior financial performance of the firm. In addition, we find that ESG news only influences investors when the earnings news is not negative, and find that what influences investors is generally new rather than historical ESG performance information.

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Appendix A: Variable Definitions

Variable	Description	Source
<i>Investor Reaction Variables:</i>		
<i>CAR</i>	Cumulative market-adjusted return during trading days [-1,1], multiplied by 100.	CRSP
<i>AbsCAR</i>	Absolute value of the cumulative market-adjusted return during trading days [-1,1], multiplied by 100.	CRSP
<i>Turnover</i>	Average share turnover during trading days [-1,1], multiplied by 100. Share turnover equals the number of shares traded divided by the number of shares outstanding.	CRSP
<i>ESG News & Performance Variables:</i>		
<i>ESGNewsNeg</i>	Indicator variable set to one if the change in the TVL Pulse score from the previous trading day is less than -5%.	Truvalue Labs
<i>ESGNewsPos</i>	Indicator variable set to one if the change in the TVL Pulse score from the previous trading day is greater than 5%.	Truvalue Labs
<i>LowESG</i>	Indicator variable set to the firm's average TVL Pulse score over the prior 365 days was in the bottom 25% of the sample.	Truvalue Labs
<i>HighESG</i>	Indicator variable set to the firm's average TVL Pulse score over the prior 365 days was in the top 25% of the sample.	Truvalue Labs
<i>ESGScore</i>	Daily TVL Pulse score (scaled from zero to one).	Truvalue Labs
<i>Earnings News & Performance Variables:</i>		
<i>MissEst</i>	Indicator variable set to one for earnings announcements days if the firm missed the analysts' consensus EPS forecast.	I/B/E/S
<i>AbsSurp</i>	The absolute value of earnings surprise, scaled by price in the prior ten trading days. Earnings surprise is the actual EPS from I/B/E/S minus the consensus EPS forecast from I/B/E/S one month before the earnings announcement. Multiplied by 100.	CRSP, I/B/E/S
<i>LowReturn</i>	Indicator variable set to one if the firm's average market-adjusted return over the prior 365 days was in the bottom 25% of the sample.	CRSP
<i>HighReturn</i>	Indicator variable set to one if the firm's average market-adjusted return over the prior 365 days was in the top 25% of the sample.	CRSP
<i>Other Variables:</i>		
<i>Size</i>	The natural log of the market value of equity (PRCCQ* CSHOQ).	Compustat
<i>M/B</i>	Market-to-book ratio calculated as (PRCCQ*CSHOQ)/CEQQ.	Compustat

Variable	Description	Source
<i>Leverage</i>	Total debt (DLCQ + DLTTQ) divided by total assets (ATQ).	Compustat
<i>SalesGrowth</i>	The percentage change in sales (SALEQ) over the previous quarter.	Compustat
<i>Analysts</i>	The natural log of one plus the number of analysts following the firm over the previous 45 days.	I/B/E/S
<i>RetVol</i>	The standard deviation of daily returns over the three prior months.	CRSP
<i>InstOwn</i>	The percentage of shares outstanding held by institutional investors.	Thomson Reuters
<i>EarnPersist</i>	The coefficient of a firm-specific OLS regression of current earnings per share on the prior year's earnings per share in the same quarter, calculated over trailing four years.	Compustat
<i>ReportLag</i>	The number of days between fiscal-quarter end and the earnings announcement date.	Compustat
<i>Loss</i>	Indicator variable set to one if the earnings before extraordinary items (IBQ) is negative.	Compustat

All accounting and market variables are measured as at or over the prior fiscal quarter unless otherwise noted. Continuous variables are winsorized at the top and bottom one percent.

Table 1: Sample Composition*Panel A: Sample Composition by Year*

<i>Year</i>	<i>Firms Years</i>		<i>Firm Days</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
2008	1,605	6.0	339,650	6.0
2009	1,858	6.9	389,295	6.9
2010	2,092	7.8	455,857	8.0
2011	2,178	8.1	479,379	8.4
2012	2,193	8.1	482,586	8.5
2013	2,284	8.5	507,611	8.9
2014	2,391	8.9	535,420	9.4
2015	2,465	9.2	542,727	9.6
2016	2,471	9.2	539,081	9.5
2017	2,519	9.4	545,474	9.6
2018	2,498	9.3	548,721	9.7
2019	2,380	8.8	311,678	5.5
Total	26,934	100.0%	5,677,479	100.0%

Panel B: Sample Composition by Industry (1-digit SIC)

<i>SIC1</i>	<i>Industry Description</i>	<i>Firms</i>		<i>Firm Days</i>	
		<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
0	Agriculture, Forestry, and Fisheries	7	0.2	10,258	0.2
1	Mineral and Construction	212	5.7	321,268	5.7
2	Manufacturing	710	19.0	955,951	16.8
3	Manufacturing	891	23.8	1,442,873	25.4
4	Transportation, Communications, and Utilities	295	7.9	547,033	9.6
5	Whole Trade and Retail Trade	330	8.8	554,206	9.8
6	Finance, Insurance and Real Estate	631	16.9	917,210	16.2
7	Service Industries	508	13.6	707,059	12.5
8	Service Industries	157	4.2	215,200	3.8
9	Public	2	0.1	6,421	0.1
Total		3,743	100.0%	5,677,479	100.0%

The sample contains 3,743 unique firms and 5,677,479 firm-days from January 2008 to July 2019. Panel A (B) presents the number of firms and firm-days for our sample by year (one-digit standard industry classification code or SIC1). Percentages may not add to 100 due to rounding.

Table 2: Descriptive Statistics*Panel A: Descriptive Statistics for Variables Used in the Regression Analyses*

	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>P25</i>	<i>Median</i>	<i>P75</i>
<i>Investor Reaction Variables:</i>						
CAR	5,677,479	0.012	3.686	-1.716	-0.031	1.678
AbsCAR	5,677,479	2.613	2.879	0.752	1.697	3.358
Turnover	5,677,479	0.949	0.917	0.394	0.677	1.16
<i>ESG News & Performance Variables:</i>						
ESGNewsNeg (Indicator)	5,677,479	0.016	0.127			
ESGNewsPos (Indicator)	5,677,479	0.017	0.128			
LowESG (Indicator)	5,677,479	0.250	0.433			
HighESG (Indicator)	5,677,479	0.250	0.433			
ESGScore	5,677,479	0.531	0.210	0.395	0.515	0.681
<i>Earnings News & Performance Variables:</i>						
AbsSurp	93,109	0.007	0.017	0.001	0.002	0.005
LowReturn (Indicator)	5,677,479	0.250	0.433			
HighReturn (Indicator)	5,677,479	0.250	0.433			
<i>Other Variables:</i>						
Size	5,677,479	7.324	1.791	6.041	7.251	8.484
M/B	5,677,479	3.073	5.324	1.25	2.04	3.62
Leverage	5,677,479	0.232	0.211	0.053	0.195	0.35
SalesGrowth	5,677,479	0.035	0.242	-0.045	0.016	0.083
Analysts	5,677,479	2.145	0.753	1.609	2.197	2.773
RetVol	5,607,205	2.536	1.448	1.533	2.141	3.112
InstOwn	5,677,479	71.065	26.085	58.656	78.693	90.755
EarnPersist	5,677,479	0.19	0.533	-0.087	0.094	0.425
ReportLag	5,677,479	33.453	11.782	26	32	38
Loss (Indicator)	5,677,479	0.258	0.438			

Panel B: Mean of ESGNews by EA Days vs. Non-EA Days

	<i>EA Days</i> <i>(1)</i>	<i>Non-EA Days</i> <i>(2)</i>	<i>p-value</i> <i>(EA Days =</i> <i>Non-EA Days)</i> <i>(3)</i>
N	93,109	5,584,370	
%ΔESGScore	0.570	0.645	[0.839]
Abs%ΔESGScore	1.667	1.384	[0.444]
Count of ESGNewsNeg Days	2,157	90,770	
% of ESGNewsNeg Days	0.023	0.016	[0.000]
Count of ESGNewsPos Days	2,024	92,046	
% of ESGNewsPos Days	0.022	0.016	[0.000]

(Continued)

Table 2 (Continued)

The table presents descriptive statistics. Panel A presents distributional descriptive statistics for variables used in our analyses of investor reaction to ESG news and performance. Definitions for each variable can be found in Appendix A. Panel B presents the means of $\% \Delta ESGScore$ ($Abs\% \Delta ESGScore$), the daily percentage change (daily absolute percentage change) in a firm's TVL ESG Pulse score, the count of $ESGNewsNeg$ ($ESGNewsPos$) Days, and the % of $ESGNewsPos$ ($ESGNewsNeg$) Days, by earnings announcements days (EA days) and non-earnings announcements days (Non-EA Days). Panel B also reports p -values from t -tests comparing the equality of means.

Table 3: Investor Reaction to ESG News*Panel A: CAR as Dependent Variable*

	EA Day (1) <i>CAR</i>	Non-EA Day (2) <i>CAR</i>
Dependent variables:		
(1) ESGNewsNeg	-0.276* (-1.92)	0.007 (0.54)
(2) ESGNewsPos	0.063 (0.41)	0.044*** (3.69)
<i>p</i> -value: (1) = (2)	[0.097]	[0.018]
ESGScore	-0.143 (-1.12)	0.005 (0.32)
Size	-1.680*** (-21.88)	-0.220*** (-11.32)
M/B	-0.000 (-0.06)	0.001 (1.02)
Leverage	-0.787*** (-2.91)	-0.284*** (-6.00)
SalesGrowth	2.224*** (17.47)	0.067*** (4.05)
Analysts	-0.148 (-1.31)	-0.032* (-1.70)
RetVol	0.113*** (3.06)	0.028** (2.21)
InstOwn	0.002 (0.73)	-0.000 (-0.75)
EarnPersist	-0.124** (-2.15)	-0.012 (-1.35)
ReportLag	-0.003 (-0.54)	-0.000 (-0.86)
Loss	-2.350*** (-27.25)	-0.139*** (-10.63)
<i>p</i> -value: ESGNewsNeg ^{EA Day} = ESGNewsNeg ^{Non-EA DAY}		[0.048]
<i>p</i> -value: ESGNewsPos ^{EA Day} = ESGNewsPos ^{Non-EA DAY}		[0.902]
Firm FE and Date FE	Included	Included
Adj. R2	0.058	0.043
N	93,109	5,584,370

(Continued)

Table 3 (Continued)*Panel B: AbsCAR and Turnover as Dependent Variable*

	EA Day (1)	Non-EA Day (2)	EA Day (3)	Non-EA Day (4)
Dependent variables:	<i>AbsCAR</i>	<i>AbsCAR</i>	<i>Turnover</i>	<i>Turnover</i>
(1) ESGNewsNeg	0.391*** (4.09)	0.178*** (17.45)	0.151*** (6.48)	0.072*** (16.79)
(2) ESGNewsPos	0.159* (1.71)	0.148*** (14.72)	0.078*** (3.52)	0.060*** (14.17)
<i>p</i> -value: (1) = (2)	[0.069]	[0.007]	[0.016]	[0.001]
ESGScore	-0.087 (-1.01)	-0.024 (-1.59)	-0.044** (-2.05)	-0.033*** (-2.85)
Size	-0.419*** (-7.91)	-0.332*** (-22.61)	0.170*** (8.29)	0.094*** (7.43)
M/B	0.006 (1.63)	0.005*** (5.95)	0.001 (1.17)	0.001** (2.18)
Leverage	0.794*** (3.94)	0.571*** (12.22)	0.593*** (7.94)	0.321*** (6.86)
SalesGrowth	0.310*** (4.21)	0.034*** (2.78)	0.077*** (5.29)	0.015** (2.20)
Analysts	0.448*** (6.09)	0.061*** (3.42)	0.323*** (11.93)	0.082*** (4.87)
RetVol	0.438*** (18.22)	0.409*** (49.85)	0.251*** (29.68)	0.198*** (34.69)
InstOwn	0.005*** (3.00)	-0.000 (-1.32)	0.007*** (9.83)	0.003*** (8.36)
EarnPersist	0.021 (0.53)	0.062*** (6.36)	0.001 (0.08)	0.007 (0.93)
ReportLag	0.001 (0.19)	0.002*** (5.21)	0.000 (0.39)	-0.000 (-1.25)
Loss	0.070 (1.31)	0.184*** (16.58)	-0.026* (-1.68)	0.018** (2.15)
<i>p</i> -value: ESGNewsNeg ^{EA Day} = ESGNewsNeg ^{Non-EA DAY}		[0.028]		[0.001]
<i>p</i> -value: ESGNewsPos ^{EA Day} = ESGNewsPos ^{Non-EA DAY}		[0.899]		[0.421]
Firm FE and Date FE	Included	Included	Included	Included
Adj. R2	0.219	0.236	0.625	0.519
N	93,109	5,5584,370	93,109	5,5584,370

(Continued)

Table 3 (Continued)

The table reports the investor reaction to ESG news on earnings announcement dates (EA Day) and non-earnings announcement dates (Non-EA Day). Panel A (B) reports the results of OLS estimation where the dependent variable is *CAR* (*AbsCAR* and *Turnover*) and the independent variables include ESG news and control variables. *ESGNewsNeg* is an indicator set to one if the change in the TVL Pulse score over the previous trading day is less than negative five percent. *ESGNewsPos* is an indicator set to one if the change in the TVL Pulse score over the previous trading day is greater than five percent. All other variables are defined in Appendix A. The *t*-statistics (in parentheses) are based on robust standard errors clustered by firm and date. The table also reports *p*-values from *F*-tests comparing the equality of coefficients. We include firm fixed effects and date fixed effects, but do not report the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% p-levels (two-tailed), respectively.

Table 4: Investor Reaction to Earnings and ESG News on Earnings Announcement Days*Panel A: CAR as Dependent Variable*

	MissEst=1	MissEst=0
	(1)	(2)
Dependent variables:	CAR	CAR
(1) ESGNewsNeg	-0.189 (-0.68)	-0.335** (-2.04)
(2) ESGNewsPos	0.198 (0.72)	0.069 (0.39)
<i>p</i> -value: (1) = (2)	[0.308]	[0.080]
AbsSurp	-21.244*** (-7.27)	52.225*** (13.12)
ESGScore	-0.150 (-0.69)	-0.075 (-0.48)
Size	-1.576*** (-13.52)	-1.585*** (-17.22)
M/B	-0.002 (-0.21)	-0.002 (-0.26)
Leverage	-1.765*** (-3.91)	-0.656** (-2.01)
SalesGrowth	1.400*** (8.11)	1.868*** (13.13)
Analysts	-0.185 (-1.12)	0.153 (1.12)
RetVol	0.249*** (4.41)	-0.035 (-0.79)
InstOwn	0.003 (0.89)	0.005* (1.74)
EarnPersist	0.093 (1.02)	-0.177** (-2.54)
ReportLag	0.022** (2.45)	-0.018*** (-2.84)
Loss	-0.807*** (-6.48)	-1.451*** (-12.81)
Firm and Date Fixed Effects	Included	Included
Adj. R2	0.093	0.078
N	30,465	61,755

(Continued)

Table 4 (Continued)*Panel B: AbsCAR and Turnover as Dependent Variable*

	MissEst=1 (1)	MissEst=0 (2)	MissEst=1 (3)	MissEst=0 (4)
Dependent variables:	<i>AbsCAR</i>	<i>AbsCAR</i>	<i>Turnover</i>	<i>Turnover</i>
(1) ESGNewsNeg	0.443** (2.34)	0.305*** (2.75)	0.150*** (3.15)	0.145*** (5.60)
(2) ESGNewsPos	0.488** (2.45)	0.003 (0.03)	0.088** (2.07)	0.079*** (3.21)
<i>p</i> -value: (1) = (2)	[0.866]	[0.043]	[0.306]	[0.050]
AbsSurp	16.021*** (7.92)	24.527*** (9.15)	2.852*** (5.49)	3.788*** (5.42)
ESGScore	0.117 (0.73)	-0.146 (-1.50)	-0.017 (-0.47)	-0.049** (-2.04)
Size	0.209** (2.56)	-0.541*** (-8.71)	0.298*** (11.41)	0.147*** (6.16)
M/B	0.005 (0.82)	0.009* (1.72)	0.001 (0.73)	0.002 (1.34)
Leverage	1.320*** (3.72)	0.410* (1.77)	0.774*** (7.33)	0.478*** (6.02)
SalesGrowth	-0.327** (-2.57)	0.637*** (6.80)	-0.003 (-0.10)	0.124*** (6.50)
Analysts	0.367*** (3.04)	0.486*** (5.53)	0.337*** (9.58)	0.315*** (10.92)
RetVol	0.334*** (8.80)	0.390*** (13.27)	0.228*** (21.14)	0.257*** (27.29)
InstOwn	0.008*** (3.37)	0.004** (1.97)	0.007*** (8.41)	0.006*** (8.52)
EarnPersist	0.003 (0.05)	0.003 (0.07)	-0.007 (-0.36)	0.003 (0.25)
ReportLag	0.002 (0.32)	-0.002 (-0.38)	-0.001 (-0.65)	0.002 (1.40)
Loss	0.255*** (2.90)	-0.175** (-2.52)	-0.007 (-0.34)	-0.069*** (-3.64)
Firm FE and Date FE	Included	Included	Included	Included
Adj. R2	0.217	0.235	0.608	0.650
N	30,465	61,755	30,465	61,755

(Continued)

Table 4 (Continued)

The table reports the reaction to earnings and ESG news on earnings announcement days partitioned by the direction of earnings news. The sample in columns (1) and (3) consists of earnings announcement days where firms missed the analysts' consensus EPS forecast ($MissEst=1$). The sample in columns (2) and (4) consists of earnings announcement days where firms met or beat the analysts' consensus EPS forecast ($MissEst=0$). Panel A (B) reports the results of OLS estimation where the dependent variable is CAR ($AbsCAR$ and $Turnover$) and the independent variables include ESG news, earnings news, and control variables. $ESGNewsNeg$ is an indicator set to one if the change in the TVL Pulse score over the previous trading day is less than negative five percent. $ESGNewsPos$ is an indicator set to one if the change in the TVL Pulse score over the previous trading day is greater than five percent. All other variables are defined in Appendix A. The t -statistics (in parentheses) are based on robust standard errors clustered by firm and date. The table also reports p -values from F -tests comparing the equality of coefficients. We include firm fixed effects and date fixed effects, but do not report the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% p -levels (two-tailed), respectively.

Table 5: Investor Reaction to Earnings and ESG Performance on Earnings Announcement Days*Panel A: CAR as Dependent Variable*

	MissEst=1	MissEst=0
	(1)	(2)
Dependent variables:	CAR	CAR
(1) LowESG	0.006 (0.05)	-0.120 (-1.49)
(2) HighESG	-0.081 (-0.76)	0.004 (0.05)
<i>p</i> -value: (1) = (2)	[0.521]	[0.218]
AbsSurp	-21.264*** (-7.28)	52.254*** (13.12)
Size	-1.576*** (-13.54)	-1.586*** (-17.20)
M/B	-0.002 (-0.21)	-0.002 (-0.27)
Leverage	-1.768*** (-3.92)	-0.650** (-1.99)
SalesGrowth	1.400*** (8.10)	1.867*** (13.13)
Analysts	-0.187 (-1.13)	0.151 (1.10)
RetVol	0.249*** (4.41)	-0.035 (-0.79)
InstOwn	0.003 (0.90)	0.005* (1.76)
EarnPersist	0.093 (1.01)	-0.177** (-2.54)
ReportLag	0.022** (2.46)	-0.018*** (-2.84)
Loss	-0.808*** (-6.49)	-1.452*** (-12.82)
Firm FE and Date FE	Included	Included
Adj. R2	0.093	0.078
N	30,465	61,755

(Continued)

Table 5 (Continued)*Panel B: AbsCAR and Turnover as Dependent Variable*

	MissEst=1 (1)	MissEst=0 (2)	MissEst=1 (3)	MissEst=0 (4)
Dependent variables:	<i>AbsCAR</i>	<i>AbsCAR</i>	<i>Turnover</i>	<i>Turnover</i>
(1) LowESG	-0.047 (-0.58)	-0.037 (-0.68)	0.001 (0.05)	0.019 (1.35)
(2) HighESG	0.023 (0.27)	-0.049 (-0.95)	0.000 (0.01)	-0.007 (-0.53)
<i>p</i> -value: (1) = (2)	[0.495]	[0.857]	[0.979]	[0.150]
AbsSurp	15.992*** (7.91)	24.523*** (9.15)	2.848*** (5.49)	3.793*** (5.43)
Size	0.208** (2.56)	-0.541*** (-8.70)	0.298*** (11.42)	0.147*** (6.17)
M/B	0.005 (0.84)	0.009* (1.71)	0.001 (0.72)	0.002 (1.34)
Leverage	1.319*** (3.73)	0.410* (1.77)	0.774*** (7.32)	0.478*** (6.00)
SalesGrowth	-0.325** (-2.55)	0.637*** (6.79)	-0.002 (-0.08)	0.124*** (6.50)
Analysts	0.374*** (3.10)	0.487*** (5.55)	0.339*** (9.63)	0.316*** (10.95)
RetVol	0.334*** (8.80)	0.391*** (13.29)	0.228*** (21.19)	0.257*** (27.32)
InstOwn	0.008*** (3.38)	0.004** (1.97)	0.007*** (8.43)	0.006*** (8.52)
EarnPersist	0.002 (0.04)	0.003 (0.06)	-0.007 (-0.37)	0.003 (0.22)
ReportLag	0.002 (0.30)	-0.002 (-0.37)	-0.001 (-0.67)	0.002 (1.40)
Loss	0.258*** (2.92)	-0.174** (-2.51)	-0.006 (-0.30)	-0.069*** (-3.61)
Firm FE and Date FE	Included	Included	Included	Included
Adj. R2	0.217	0.235	0.608	0.649
N	30,465	61,755	30,465	61,755

(Continued)

Table 5 (Continued)

The table reports the reaction to earnings and ESG performance on earnings announcement days partitioned by the direction of earnings news. The sample in columns (1) and (3) consists of earnings announcement days where firms missed the analysts' consensus EPS forecast ($MissEst=1$). The sample in columns (2) and (4) consists of earnings announcement days where firms met or beat the analysts' consensus EPS forecast ($MissEst=0$). Panel A (B) reports the results of OLS estimation where the dependent variable is CAR ($AbsCAR$ and $Turnover$) and the independent variables include ESG performance, earnings news, and control variables. $LowESG$ is an indicator set to one if the firm's average TVL Pulse score over the previous 365 days was in the bottom 25% of the sample. $HighESG$ is an indicator set to one if the firm's average TVL Pulse score over the previous 365 days was in the top 25% of the sample. All other variables are defined in Appendix A. The t -statistics (in parentheses) are based on robust standard errors clustered by firm and date. The table also reports p -values from F -tests comparing the equality of coefficients. We include firm fixed effects and date fixed effects, but do not report the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% p-levels (two-tailed), respectively.

Table 6: Investor Reaction to ESG News and Financial Performance on ESG News Days*Panel A: CAR as Dependent Variable*

	ESGNewsNeg=1	ESGNewsPos=1
	(1)	(2)
Dependent variables:	CAR	CAR
(1) LowReturn	0.018 (0.43)	0.061 (1.50)
(2) HighReturn	-0.036 (-1.06)	-0.051 (-1.62)
<i>p</i> -value: (1) = (2)	[0.309]	[0.031]
ESGScore	0.258*** (2.78)	0.166* (1.89)
Size	-0.298*** (-5.71)	-0.304*** (-5.77)
M/B	0.001 (0.33)	-0.002 (-0.88)
Leverage	-0.532*** (-2.72)	-0.105 (-0.56)
SalesGrowth	-0.075 (-0.91)	-0.026 (-0.35)
Analysts	-0.027 (-0.35)	-0.111 (-1.44)
RetVol	0.058* (1.90)	0.004 (0.13)
InstOwn	0.002 (1.27)	0.002 (1.44)
EarnPersist	-0.045 (-1.19)	0.060 (1.61)
ReportLag	-0.001 (-0.38)	-0.002 (-1.12)
Loss	-0.081 (-1.59)	-0.215*** (-4.52)
Firm FE and Date FE	Included	Included
Adj. R2	0.053	0.050
N	90,389	91,641

(Continued)

Table 6 (Continued)*Panel B: AbsCAR and Turnover as Dependent Variable*

	ESGNewsNeg=1	ESGNewsPos=1	ESGNewsNeg=1	ESGNewsPos=1
	(1)	(2)	(3)	(4)
Dependent variables:	<i>AbsCAR</i>	<i>AbsCAR</i>	<i>Turnover</i>	<i>Turnover</i>
(1) LowReturn	0.280*** (9.84)	0.258*** (8.58)	0.132*** (11.02)	0.111*** (9.72)
(2) HighReturn	-0.016 (-0.75)	0.023 (1.06)	0.058*** (6.37)	0.060*** (6.52)
<i>p</i> -value: (1) = (2)	[0.000]	[0.000]	[0.000]	[0.001]
ESGScore	0.028 (0.42)	-0.217*** (-3.52)	0.010 (0.40)	-0.159*** (-6.85)
Size	-0.240*** (-5.95)	-0.344*** (-9.44)	-0.012 (-0.46)	-0.036 (-1.43)
M/B	0.003 (1.55)	0.006*** (2.59)	0.001 (0.77)	0.000 (0.45)
Leverage	0.651*** (4.62)	0.643*** (4.77)	0.321*** (3.69)	0.367*** (4.33)
SalesGrowth	0.035 (0.60)	0.005 (0.08)	0.031 (1.48)	0.029 (1.45)
Analysts	-0.002 (-0.02)	0.019 (0.31)	0.061 (1.64)	0.062* (1.65)
RetVol	0.399*** (17.52)	0.410*** (18.76)	0.229*** (19.03)	0.240*** (19.87)
InstOwn	-0.000 (-0.45)	-0.001 (-1.11)	0.002*** (2.68)	0.002*** (2.85)
EarnPersist	0.061** (2.15)	0.089*** (3.33)	0.009 (0.65)	0.011 (0.78)
ReportLag	0.007*** (4.30)	0.006*** (3.52)	0.001 (1.18)	0.001 (1.57)
Loss	0.169*** (4.63)	0.148*** (4.28)	0.066*** (3.73)	0.062*** (3.47)
Firm FE and Date FE	Included	Included	Included	Included
Adj. R2	0.262	0.274	0.530	0.553
N	90,389	91,641	90,389	91,641

(Continued)

Table 6 (Continued)

This table reports the reaction to ESG news and financial performance on ESG news days partitioned by the direction of the ESG news. The sample in columns (1) and (3) consists of days where the change in TVL Pulse score over the previous trading day is less than negative five percent (*ESGNewsNeg*=1). The sample in columns (2) and (4) consists of days where the change in the TVL Pulse score over the previous trading day is greater than five percent (*ESGNewsPos*=1). Panel A (B) reports the results of OLS estimation where the dependent variable is *CAR* (*AbsCAR* and *Turnover*) and the independent variables include financial performance and control variables. *LowReturn* is an indicator variable set to one if the firm's average market-adjusted return over the prior 365 days was in the bottom 25% of the sample. *HighReturn* is an indicator variable set to one if the firm's average market-adjusted return over the prior 365 days was in the top 25% of the sample. The table also reports *p*-values from *F*-tests comparing the equality of coefficients. We include firm fixed effects and date fixed effects, but do not report the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% *p*-levels (two-tailed), respectively.