São Paulo 27 a 29 de julho 2022.

Disentangling the Association between ESG and Analysts' Forecasts

JOSÉ ELIAS FERES DE ALMEIDA
Federal University of Espirito Santo, Brazil
DANTE VIANA, JR
FUCAPE Business School, Brazil
DEVENDRA KALE
The University of Rhode Island, United States

Abstract

We examine how ESG performance affects analysts' forecasts. Based on limited evidence on the association between ESG and analysts' forecasts, we argue that some aspects of ESG blur the ability of analysts to fully incorporate it into their forecasts. More specifically, while the ESG initiatives reported can be a channel to communicate better practices to investors and consumers that is reflected in revenues, for disentangling the costs related to ESG performance in the financial reporting can be a very difficult task to be performed increasing the error of EPS forecasts. We use a sample of 12,577 US firm-year observations between 2011 and 2018. Our findings suggest that ESG performance reduces analysts' revenues forecasts errors, but not EPS forecasts ones. Our results are robust by splitting the ESG into its three components individually, as well as considering a battery of robustness tests. Even though a greater ESG engagement can improve firms' sales through better customer relationships, and consequently helping analysts to better forecast revenues, we posit that the costs related to ESG are fuzzy to uncover and hardly to be incorporated as inputs into their forecasts.

Keywords: analysts' forecasts, ESG, capital market, analysts, corporate governance.

22º USP International Conference in Accounting
"Accounting in favor of sustainable development"
São Paulo 27 a 29 de julho 2022.

1. Introduction

The Environmental, Social, and Governance (hereafter, ESG) pillars became an essential attribute for firms to differentiate themselves from investors and customers. In fact, the firms' investments in ESG are massive. A survey conducted in December 2020 by NAVEX Global (2021), a leader in integrated risk and compliance management solutions, including responses from 1,250 management and senior level executives in the U.S., U.K., France and Germany, reveals that 88% of publicly traded companies have ESG initiatives in place followed by 79% of venture and private equity-backed companies and 67% of privately-owned companies, according to respondents. In line with that, a recent analysis of Bloomberg Intelligence (2021) reports that global ESG assets are on track to exceed $53 trillion by 2025, representing more than a third of the $140.5 trillion in projected total assets under management, having the United States (US) a strongest expansion in 2021 and with good perspective to dominate the category in 2022 over Europe and Asia.

Given the growing interest by economic agents and stakeholders in ESG, previous literature provides consistent empirical evidence on the benefits associated with a higher level of ESG initiatives by firms, such as lower levels of cost of capital (Ng and Rezaee, 2015) and information asymmetry (Siew et al., 2016), as well as a high-quality of board of directors (Gangi et al., 2022) and improvements in firm' performance (Alareeni and Hamdan, 2020). The literature also provides some evidence on the relation between ESG and analysts forecast (e.g., Dhaliwal et al., 2012; Cormier and Magnan, 2014; Lee et al., 2015; Krasodomska and Cho, 2017). However, this literature is limited, usually focusing only on disclosure rather than ESG performance. Based on such limited evidence, we examine how ESG performance affects analysts' forecasts. More specifically, we disentangle the analysts' forecasts positing that the costs of ESG are not directly observed in financial statements and to be incorporated as input in forecasts, because there is no direct channel linking ESG investments with firm performance.

We posit that ESG initiatives by firms can affect the behavior of investors and customers, suggesting that firms with high ESG can attract more attention from market participants, which affects revenue growth from clients' perspective or more market capitalization from investors perspectives. Thus, firms' ESG performance could help to increase demand for firms' products or services and consequently boost their revenues. These improvements in revenues resulted from a higher engagement in ESG initiatives could be directly observable by the market, including financial analysts, and therefore reducing analysts' sales forecast error. However, the costs associated with ESG activities are not directly detected. In other words, disentangling the expenses related to ESG performance in the financial reporting can be a challenging task to be performed.

Thus, we argue that from the product market perspective, analysts could improve their forecasts (accuracy) on revenues, however from the perspective of the ESG costs, it is not clear how to identify them all when reflected in income statement or cash flow statement due to the aggregate aspect of accounting disclosures. We base our empirical analyses on a sample of 12,577 US firm-year observations between 2011 and 2018 to examine our predictions by considering only firms followed by analysts. Our findings suggest that analysts' forecasts are more accurate for revenue, while we find no evidence or weak evidence in some additional analyses for EPS forecasts. This finding sheds some new light on the effect of ESG on analysts' forecasts and makes several contributions to the literature and market participants. First, customers and investors are relevant players in the product and capital markets and their behavior is expected to be captured in analysts' reports. Second, since our results are robust for several estimates and different procedures, the economic consequence of ESG reflects the "fuzzy effect" of ESG information on financial statements. Third, our results point to the

2

possibility of ESG positively influencing future sales, but the existing costs removing most of the benefit. This is important for regulators to consider, as they formalize ESG standards.

The remainder of this paper is organized as follows. Section 2 discusses the previous literature and outlines the hypotheses. Section 3 presents the research design. Section 4 shows both the main empirical findings and additional/robustness tests. Finally, Section 6 delivers concluding remarks.

2. Hypotheses Development

There is a growing demand from the market participants to capture a broad picture of corporate governance, including environmental and social initiatives, broadly defined as ESG initiatives. Recent literature on ESG has shown that some ESG measures are correlated among them as well as companies' rating generating confusion among market participants due to its particular aggregate attribute (Berg et al. 2019). However, the results are different according to the data provider of ESG measures. The main difference between ESG scores and prior studies on CSR disclosures and corporate governance is that the first one is developed by data providers collecting information independently and retrieved by researchers while CSR is collected by researchers using textual tools or hand-collected and corporate governance both.

The combined ESG initiatives grow from seminal studies on corporate governance and sustainability, later on integrating the social context of firms, even though the terms "corporate social responsibility" and ESG to be frequently used interchangeably in the literature (e.g., Gillan et al., 2021). Prior literature shows that the quality of corporate governance system is associated with better analysts' forecasts (Ali et al. 2012; Lee et al. 2016). The underlying assumption is that firms with strong corporate governance mechanisms better protect investors and creditors (Shleifer and Vishny, 1997) and improve information environment measured by analysts' accuracy (Byard, Li and Weintrop, 2006; Bhat, Hope and Kang, 2006).

Existing literature relating to sustainability can be sub-divided into two main buckets: firms' reporting of sustainability and company performance in sustainability. While the literature on that is rather limited, the research is growing in both of these areas.

Dhaliwal et al. (2012) investigate how companies' CSR disclosure impacts analyst forecast accuracy. They use a sample of 31 countries and find that CSR disclosure by companies improves analyst forecast accuracy. They also find that the impact of CSR disclosure on forecast accuracy lasts for up to 3 years in the future. Lee et al. (2015) study the value of analyst stock recommendations driven by voluntary CSR disclosure. The authors state that voluntary reporting of CSR improves investors' information set, and it can thereby make analyst stock recommendations less relevant (as it could reduce the need for information from analysts). The authors find that the value of recommendations reduces for upgrades and increases for downgrades. This implies that market better prices the stock of firms that issue voluntary CSR disclosure. However, this also implies that analysts may not be able to incorporate the CSR information reported by companies. In addition, Krasodomska and Cho (2017) investigate the impact of CSR disclosure on sell-side analysts and buy-side analysts separately. They survey the two types of analysts and investigate if analysts incorporate the CSR information. While the authors document that analysts do not fully incorporate the CSR information yet, there is certainly a tendency to move towards incorporating CSR information in their analysis. Cormier and Magnan (2014) investigate the impact of CSR disclosure on analyst forecast accuracy, and whether corporate governance has a mediating role in this link. They document that more CSR disclosure results into tighter analyst forecast consensus, and further find that CSR disclosure, via its effect on governance, indirectly influences forecast accuracy. These findings suggest that

3

ESG measures overcome the need for corporate governance mechanisms as control since governance is a pillar of ESG. The issue is that using all individual pillars mixed show an aggregate information that can confuse (Berg et al 2019) analysts to incorporate fully the ESG information into their forecasts.

Another stream of literature focuses on firms' CSR performance as opposed to CSR disclosure. Hsu et al. (2017) find that when companies report earnings, both positive and adverse CSR performance by firms influences analyst forecast revisions. Ioannou & Serafeim (2014) analysts' perceptions about firms' CSR performance has changed over the years. They document that in 1990s, analysts issued more pessimistic forecasts for firms with high CSR ratings. However, that trend is changing, and analysts are now issuing more favorable forecasts for firms with high CSR ratings. Lou et al. (2015) show that CSR performance can be ambiguous and uncertain. In the absence of regulations, absorbing the information can be tricky. The authors document that analysts can allow better absorption of information on firms' CSR performance, by documenting a positive relation between CSR performance and analyst stock recommendations.

All this research shows that CSR performance influences investors as well as analysts. However, the existing research is silent on two main points. First, how does firms' ESG performance vis-à-vis firms' CSR performance influence analysts. ESG performance is more exhaustive than CSR performance, and is thereby also more difficult to quantify. To add to that, what aspect of firms' ESG performance drives analyst decisions is not known. Moreover, the aggregate information of ESG generates confusion (Berg et al. 2019). Second, what is the channel that reduces analyst forecast error – is it analysts better incorporating information or because companies with better performance fare better, thereby closing the gap on analyst forecasts? As we can see above, it is still unclear whether analysts (fully) incorporate information on sustainability performance.

Our paper fills this gap in the literature by investigating how firms' ESG performance influences analyst forecast error. Further, we examine two types of analysts' forecasts: sales and EPS. This research identification allows us to understand the channel through which ESG performance is fully or partially incorporated into analysts' forecasts. For instance, if ESG initiatives work as a cornerstone to investor and consumers, this would reflect in sales performance and this channel would be incorporate into analysts' forecasts. In the case of EPS, thinking into the financial reporting, the disclosure of ESG performance through notes and additional reports could be not enough to analysts disentangling the effect of each ESG pillar. Then, ESG performance could be not directly incorporated in EPS forecasts, which makes us to propose the following hypothesis:

H1: The level of ESG performance is negatively associated with the level of analysts' revenues forecasts errors.

It is not clear in the literature and in financial reporting how the costs related to ESG transit through income statement or is seen in balance sheet. This information could be hard to pick them up from financial reporting due to their aggregate characteristic incorporated in costs/expenses with other types of expenditures. In such case, we posit that the costs related to ESG are aggregate with many other costs increasing the difficult to analysts fully incorporate the ESG information into their forecasts. However, not all ESG expenditures are mixed with other costs/expenses, for instance, the compensation of directors is directly observed while costs related to develop an environmental policy or revise code of ethics and so on are not easily

4

found, neither in notes. Even for highly transparent firms in their reports showing their initiatives that benefit the society, it is still hard to translate into financial numbers.

This condition affects the ability to uncover ESG costs that directly impact the bottom line of income statement, net income. Since analysts forecasts EPS, we posit that ESG performance affect analysts' forecasts increasing the forecasts' errors of EPS, reflected in our second hypothesis as following:

H2: The level of ESG performance is positively associated with analysts' EPS forecasts errors.

3. Research Design

3.1. Sample

We use US firm-level data of both analyst' forecast errors and ESG performance, as well as available data for control variables (all variables are defined on Appendix A). We retrieve the accounting figures, analysts' forecasts and ESG initiatives, from Refinitiv Eikon database. Our sample covers the years between 2011 and 2018, resulting in a sample of 12,577 US firm-year observations, according to Table 1.

Table 1. Sample

Panel A - Year breakdown

Year	Freq.	Percent	Cum.
2011	1,102	8.76	8.76
2012	1,133	9.01	17.77
2013	1,143	9.09	26.86
2014	1,160	9.22	36.08
2015	1,200	9.54	45.62
2016	1,513	12.03	57.65
2017	1,686	13.41	71.06
2018	1,813	14.42	85.47
2019	1,827	14.53	100.00
Total	**12,577**	**100.00**	**-**

Panel B - Industry breakdown

SIC-Code	Freq.	Percent	Cum.
Mining	1,581	12.57	12.57
Construction	211	1.68	14.25
Manufacturing	7,605	60.47	74.72
Transportation & Public Utilities	323	2.57	77.28
Wholesale Trade	209	1.66	78.95
Retail Trade	556	4.42	83.37
Services	2,092	16.63	100.00
Total	**12,577**	**100.00**	**-**

3.2. Empirical Model and Variables

To test hypothesis H1 (H2) – whether the level of ESG performance is negatively (positively) associated with the level of analysts' revenues (EPS) forecasts errors – we consider analysts' revenues (EPS) forecasts errors as the dependent variable, and firms' ESG practices as the main independent one, according to Equation (3):

$$FORECASTS\ ERROR_{it} = \alpha_0 + \beta_1 ESG\ PERFORMANCE_{it} + \gamma \sum Controls_{it} + \varepsilon \quad (1)$$

5

where, for each firm *i* in year *t*, *FORECASTS ERROR* is both analysts' revenues (*ERROR SALES*) and EPS (*ERROR EPS*) forecasts errors. *ESG PERFORMANCE* is the firms' engagement with ESG practices, according to the Refinitiv database. Controls is a vector of control variables including *SIZE*, *LEVERAGE*, *LOSS*, *CHANGE SALES*, *CHANGE EPS*, *RETURN OF EQUITY*, *BOOK-TO-MARKET* AND *LN_ANALYSTS*, all defined in Table 2.

For Equation (1), considering *ERROR SALES* (*ERROR EPS*) as the dependent variable, we expect the coefficient β_1 to be significantly negative (positive) – suggesting that the level of ESG performance is negatively (positively) associated with the level of analysts' sales (EPS) forecasts errors. Besides, in all estimations, we also include a vector of the control variable (*Controls*) that prior research identifies as associated with analysts' forecasts errors (e.g., García Lara et al., 2014; Liang and Riedl, 2014; Glaum et al., 2013).

Equation (1) is estimated based on Ordinary Least Squares (OLS) estimator, controlled for industry- and year-fixed effects following prior studies (Dhaliwal et al., 2012; Muslu et al., 2019). To adjust for possible cross-sectional and serial correlations, standard errors are clustered at firm-level (Petersen, 2009). All continuous firm variables, except the *ESG PERFORMANCE*, are winsorized at 1% and 99%.

Table 2. Variables' description

Dependent Variables	
ERROR SALES	is the absolute value of the analysts' sales forecast errors (the difference between the realized sales and the mean sales consensus forecast for firm *i* for year *t*) scaled with the realized firms' sales.
ERROR EPS	is the absolute value of the analysts' EPS forecast errors (the difference between the realized EPS and the mean EPS consensus forecast for firm *i* for year *t*) scaled with the realized firms' EPS.
Independent Variable	
ESG PRATICE	is the combined score from the E, S and G pillars from the Thomson Reuters Refinitiv ESG measure.
Control Variables	
SIZE	is the natural logarithm of end of year total assets.
LEVERAGE	is the end of year total leverage scaled by end of year total assets.
LOSS	is a dummy variable, which equals one for firm-year observations if net income is lower than 0, and zero otherwise.
CHANGE SALES	is the relative change of sales realized in the reported year in comparison with the previous year.
CHANGE EPS	is the relative change of EPS realized in the reported year in comparison with the previous year.
ROE	is the earnings before interest and tax scaled by end of year total equity.
BOOK TO MARKET	is the book value of equity scaled by end of year total market value of equity.
LN_ANALYSTS	is the natural logarithm of one plus the total number of analysts following.

3.2.1. Analysts' Forecasts Errors

Following a large and consistent stream of analyst forecast literature (e.g., Dittmar and Thakor, 2007; Orens and Lybaert, 2007; García Lara et al., 2011; García Lara et al., 2014), we measure analysts' sales (EPS) forecasts errors based on the absolute difference between the realized sales (EPS) and the mean sales consensus forecast for firm *i* for year *t*, scaled with the realized firms' sales (EPS), according to Equations (2) and (3). Our main empirical findings are robust by taking the median value of sales (EPS) to calculate analysts' consensus forecast.

$$ERROR\ SALES_{it} = \frac{|ACTUAL\ SALES_{it} - FORECAST\ SALES_{it}|}{ACTUAL\ SALES_{it}} \tag{2}$$

$$ERROR\ EPS_{it} = \frac{|ACTUAL\ EPS_{it} - FORECAST\ EPS_{it}|}{ACTUAL\ EPS_{it}} \tag{3}$$

where, for each firm *i* in year *t*, *SALES ERROR* (*EPS ERROR*) is the analysts' sales (EPS) forecasts errors. *ACTUAL SALES* (*ACTUAL EPS*) is the realized sales (EPS). *FORECAST SALES* (*FORECAST EPS*) is the mean sales (EPS) consensus forecast.

3.2.2. ESG performance

We proxy firm-level ESG performance based on the firms' ESG scores from Refinitiv Eikon database, which reflects company's ESG performance, commitment and effectiveness based on publicly-reported information. More specifically, Refinitiv Eikon captures and calculates over 500 company-level ESG measures, of which a subset of 186 of the most comparable and material per industry, power the overall company assessment and scoring process. These are grouped into 10 categories which represents the environmental (resource use, emissions, innovation), social (product responsibility, human rights, community, workforce) and governance (management, shareholders, corporate social responsibility strategy) pillars (Refinitiv, 2022). Actually, one of the advantages of ESG Refinitiv score over potential alternative databases is that its metrics are transparent and based on publicly-reported information (Reber et al., 2021), and therefore has been used by many studies (e.g., Stolowy and Paugam, 2018; Drempetic et al., 2020; Batae et al., 2021; Bose et al., 2021).

4. Results

4.1. Descriptive Statistics

Table 3 shows the descriptive statistics concerning the dependent, independent and control variables. The mean of *ERROR SALES* (*ERROR EPS*) is 0.0130 (0.0252). We also find that the mean of *ESG PERFORMANCE* is 53.36, aligned with previous studies based on ESG Refinitiv score in US market (e.g., Bofinger et al., 2022; Kim et al., 2019). Panel B of Table 2 shows that there is difference of forecasts error of sales (*ERROR SALES*) of firms with high ESG performance versus firms with low ESG performance, however, is not statistically significant the difference for *ERROR EPS*.

Table 3. Descriptive statistics

Panel A – Variables

Variables	N	Mean	p25	Median	p75	SD
ERROR SALES	12,577	0.0130	0.0024	0.0057	0.0122	0.0251
ERROR EPS	12,577	0.0252	0.0035	0.0131	0.0394	0.1901
ESG PRATICE	12,577	53.3603	37.3900	53.5900	69.5000	19.8104
SIZE	12,577	23.1670	22.0239	23.1197	24.2718	1.5532
LEVERAGE	12,577	0.6252	0.4748	0.6092	0.7712	0.2416
LOSS	12,577	0.0790	0.0000	0.0000	0.0000	0.2697
CHANGE SALES	12,577	0.0775	-0.0162	0.0517	0.1429	0.2058
CHANGE EPS	12,577	-0.0001	-0.0812	0.0857	0.2119	1.1073
RETURN ON EQUITY	12,577	0.2106	0.1015	0.2029	0.3472	1.2847
BOOK TO MARKET	12,577	0.3822	0.1486	0.3004	0.5155	0.3863
LN_ANALYSTS	12,577	2.8854	2.5649	2.9957	3.2581	0.5692

Panel B – Mean Comparison

	High-ESG (> percentil 50)			Low-ESG (<= percentil 50)		
	N	Mean		N	Mean	
Error Sales	6,283	0.0104	***	6,294	0.0155	***
Error EPS	6,283	0.0230		6,294	0.0273	

This table presents descriptive statistics of the variables included in our estimations. *ERROR SALES* (*ERROR EPS*) is the analysts' sales (EPS) forecast error. *ESG PERFORMANCE* is the combined score from the E, S and G pillars from the Thomson Reuters Refinitiv ESG measure. *SIZE* is the natural logarithm of end of year total assets. *LEVERAGE* is the end of year total leverage scaled by end of year total assets. *LOSS* is a dummy variable, which equals one for firm-year observations if net income is lower than 0, and zero otherwise. *CHANGE SALES* (*CHANGE EPS*) is the relative change of sales (EPS) realized in the reported year in comparison with the previous year. *RETURN ON EQUITY* is the earnings before interest and tax scaled by end of year total equity. *BOOK TO MARKET* is the book value of equity scaled by end of year total market value of equity. *LN_ANALYSTS* is the natural logarithm of one plus the total number of analysts following. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

Table 4 presents the Pearson correlation matrix between the variables included in our estimations. Both *ERROR SALES* and *ERROR EPS* are negatively and statistically correlated with *ESG PRACTICE* (-0.1248***, and -0.0214*, respectively). Even though both correlations are statistically significant, the association between Error EPS and ESG Practice is almost economically insignificant (i.e., around 2%).

Therefore, although based only on univariate analysis, these findings are overall aligned with H1 and H2, suggesting that the level of ESG practices is negatively associated (not associated) with the level of analysts' sales (EPS) forecasts errors. Moreover, we observe that both *ERROR SALES* and *ERROR EPS* are also significantly correlated at conventional levels with all control variables, which suggests the importance of controlling for these variables in multivariate analyses as observed in the previous literature (e.g., García Lara et al., 2014; Liang and Riedl, 2014; Glaum et al., 2013). Finally, multicollinearity problems also seem to be negligible considering that the association between independent variables is still below 0.63.

Table 4. Correlation Matrix

		1.	*2.*	*3.*	*4.*	*5.*
1.	*ERROR SALES*	-				
2.	*ERROR EPS*	0.0655***	-			
3.	*ESG PRATICE*	-0.1248***	-0.0214*	-		
4.	*SIZE*	-0.0708***	-0.0247**	0.6257***	-	
5.	*LEVERAGE*	-0.0751***	-0.0527***	0.1763***	0.0950***	-
6.	*LOSS*	0.2046***	-0.1242***	-0.1960***	-0.1873***	-0.0297***
7.	*CHANGE SALES*	-0.0841***	0.0349***	-0.2304***	-0.1187***	-0.1841***
8.	*CHANGE EPS*	-0.0569***	0.0275**	0.0263**	0.0332***	-0.0700***
9.	*ROE*	-0.0200*	0.0214*	0.0622***	0.0892***	-0.0489***
10.	*BOOK TO MARKET*	0.1676***	0.0544***	-0.1380***	-0.0151	-0.3848***
11.	*LN_ANALYSTS*	-0.0474***	-0.0235**	0.3169***	0.6044***	-0.1447***
		6.	*7.*	*8.*	*9.*	*10.*
6.	*LOSS*	-				
7.	*CHANGE SALES*	-0.0371***	1.0000			
8.	*CHANGE EPS*	-0.1351***	0.1115***	1.0000		
9.	*ROE*	-0.1018***	-0.0063	0.0397***	1.0000	
10.	*BOOK TO MARKET*	0.1781***	-0.0378***	-0.0530***	-0.0139	1.0000
11.	*LN_ANALYSTS*	-0.0625***	0.0506***	0.0273**	0.0274**	-0.0565***

This table presents the correlation matrix of the variables included in our estimations. *ERROR SALES* (*ERROR EPS*) is the analysts' sales (EPS) forecast error. *ESG PERFORMANCE* is the combined score from the E, S and G pillars from the Thomson Reuters Refinitiv ESG measure. *SIZE* is the natural logarithm of end of year total assets. *LEVERAGE* is the end of year total leverage scaled by end of year total assets. *LOSS* is a dummy variable, which equals one for firm-year observations if net

8

22º USP International Conference in Accounting
"Accounting in favor of sustainable development"
São Paulo 27 a 29 de julho 2022.

income is lower than 0, and zero otherwise. *CHANGE SALES* (*CHANGE EPS*) is the relative change of sales (EPS) realized in the reported year in comparison with the previous year. *RETURN ON EQUITY* is the earnings before interest and tax scaled by end of year total equity. *BOOK TO MARKET* is the book value of equity scaled by end of year total market value of equity. *LN_ANALYSTS* is the natural logarithm of one plus the total number of analysts following. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

4.2. Regression Results

Table 5 presents the empirical findings of the regression models performed to test hypothesis H1 (H2) – whether the level of ESG practices is negatively associated (not associated) with the level of analysts' revenues (EPS) forecasts errors. For *ERROR SALES* estimation we find that the coefficient of *ESG PERFORMANCE* is significantly negative in different estimation scenarios: taking into account only for both industry- and year-fixed effects (-0.015***, *t*-stat = -10.26); and incorporating all the control variables and both industry- and year-fixed effects (-0.012***, *t*-stat = -6.56). These empirical findings suggest that higher levels of firms' engagements in ESG activities are negatively associated with analysts' sales forecast errors. In other words, it seems that high levels of ESG performance benefits analysts to better predict the future sales at firm-level. These findings support H1.

Table 5. The association between analyst' forecast error and ESG performance

$$Forecasts\ Error_{it} = \alpha_0 + \beta_1 ESG\ Performance_{it} + \gamma \sum Controls_{it} + \varepsilon$$

	ERROR SALES		ERROR EPS	
Constant	0.036***	0.036***	0.024	0.174***
	(34.82)	(7.65)	(1.39)	(4.60)
ESG PRATICE	**-0.015***	**-0.012***	**-0.003**	**0.010**
	(-10.26)	(-6.56)	(-0.29)	(0.74)
SIZE		0.001*		-0.006***
		(1.87)		(-2.81)
LEVERAGE		-0.006***		-0.036***
		(-4.63)		(-3.61)
LOSS		0.011***		-0.106***
		(7.96)		(-7.36)
RETURN ON EQUITY		0.000		0.001*
		(0.92)		(1.93)
BOOK TO MARKET		-0.000		0.030***
		(-0.40)		(3.26)
LN_ANALYSTS		-0.004***		-0.004
		(-5.15)		(-0.70)
CHANGE SALES		-0.013***		
		(-6.68)		
CHANGE EPS				0.002
				(0.92)
Industry-FE	*Yes*	*Yes*	*Yes*	*Yes*
Year-FE	*Yes*	*Yes*	*Yes*	*Yes*
Observations	12,577	12,577	12,577	12,577
R-squared	0.1457	0.1718	0.0168	0.0421

This table presents estimates from OLS regressions in order to test association between analyst' forecast error and ESG practices. The dependent variable is *ERROR SALES* (*ERROR EPS*), the analysts' sales (EPS) forecast error. *ESG PRACTICE* is the combined score from the E, S and G pillars from the Thomson Reuters Refinitiv ESG measure. *SIZE* is the natural logarithm of end of year total assets. *LEVERAGE* is the end of year total leverage scaled by end of year total assets. *LOSS* is a dummy variable, which equals one for firm-year observations if net income is lower than 0, and zero otherwise. *CHANGE SALES* (*CHANGE EPS*) is the relative change of sales (EPS) realized in the reported year in comparison with the previous year. *ROE* is the earnings before interest and tax scaled by end of year total equity. *BOOK TO MARKET* is the book value of equity

scaled by end of year total market value of equity. *LN_ANALYSTS* is the natural logarithm of one plus the total number of analysts following. The *t*-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

Moreover, for *ERROR EPS* estimation we find that the coefficient of *ESG PERFORMANCE* is not significant, at conventional levels, in different estimation scenarios: taking into account only for both industry- and year-fixed effects (-0.003, *t*-stat = -0.29); and incorporating all the control variables and both industry- and year-fixed effects (0.010, *t*-stat = 0.74). These empirical findings suggest that higher levels of firms' engagements in ESG activities are not associated with analysts' EPS forecast errors. In other words, it seems that high levels of ESG engagement do not favor analysts better predict the firm-level EPS. These findings do not support H2.

Concerning control variables, the results in Table 4 also suggest that larger (*SIZE*), less leveraged (*LEVERAGE*), loss firms (*LOSS*), followed by fewer analysts (*LN_ANALYSTS*), and with lower levels of changing in sales (*CHANGE SALES*) are associated with high levels of analysts' sales forecast errors. We also find that smaller, less leveraged, firms with positive results, more profitable, and with high book-to-market levels are associated with high levels of analysts' EPS forecast errors.

Looking for additional evidence on the association between ESG and analysts' forecast errors, we analyze Equation (4) by considering the performance of environmental, social, and governance pillars of ESG individually. The results are presented in Table 6. All estimates are controlled for industry- and year-fixed effects and all control variables. For *SALES ERROR*, we find that all ESG pillars performed as expected in H1, namely all coefficients are negatively associated with analysts' sales forecast errors, the coefficient of *ENVPERF(E)* = -.0.007*** (*t*-stat = -5.28), *SOCIALPERF(S)* = -0.005*** (*t*-stat = -3.22) and *GOVPERF(G)* = -0.006*** (*t*-stat = -4.90). Moreover, For *EPS ERROR*, we find positive coefficients, but not statistically significant for all ESG pillars individually, 0.014, 0.014 and -0.013 for *ENVPERF(E)*, *SOCIALPERF(S)* and *GOVPERF(G)*, respectively.

Taking the empirical findings as a whole, we find evidence that firm ESG performance seems to help analysts better predict future sales, but not EPS. Based on such evidence, concerning sales forecasting, we argue that a greater firms' involvement with ESG initiatives can potentially translate into higher sales volumes through better customer relationships. Indeed, the incorporation of social and environmental initiatives into firms' strategy is increasingly viewed as a source of financial benefits (Krasodomska and Cho, 2017). Our additional analysis in the following section confirms this assumption. In this sense, analysts are able to directly incorporate this marginal effect from ESG initiatives into their sales forecasts. On the other hand, concerning EPS forecasting, this could hardly happen, given that the costs associated with ESG activities are not directly detected. This argument is in line with previous literature which points out that analysts in fact give low assessments to the quality of corporate social responsibility disclosure, consequently making them rarely use this type of information in their predictions (Krasodomska and Cho, 2017).

Table 6. The association between analyst' forecast error and ESG performance by pillar

$$Forecasts\ Error_{it} = \alpha_0 + \beta_n \sum E, S, G_{it} + \gamma \sum Controls_{it} + \varepsilon$$

	ERROR SALES			ERROR EPS		
Constant	0.036***	0.050***	0.043***	0.191***	0.161***	0.182***
	(7.32)	(11.93)	(8.71)	(4.65)	(4.80)	(4.99)
ENVPERF(E)	**-0.007***			**0.014**		
	(-5.28)			(1.50)		
SOCIALPERF (S)		**-0.005***			**0.014**	
		(-3.22)			(1.29)	
GOVPERF (G)			**-0.006***			**-0.013**
			(-4.90)			(-1.34)
SIZE	0.000	-0.000	0.000	-0.007***	-0.005**	-0.006***
	(1.30)	(-1.11)	(0.08)	(-3.06)	(-2.57)	(-3.23)
LEVERAGE	-0.007***	-0.006***	-0.007***	-0.036***	-0.033***	-0.036***
	(-4.91)	(-4.77)	(-4.96)	(-3.68)	(-3.44)	(-3.67)
LOSS	0.011***	0.011***	0.011***	-0.106***	-0.107***	-0.106***
	(8.21)	(7.96)	(8.17)	(-7.40)	(-7.47)	(-7.39)
RETURN ON EQUITY	0.000	0.000	0.000	0.001*	0.001*	0.001*
	(1.18)	(0.64)	(0.86)	(1.83)	(1.91)	(1.91)
BOOK TO MARKET	-0.000	0.000	-0.000	0.031***	0.030***	0.031***
	(-0.27)	(0.09)	(-0.25)	(3.29)	(3.26)	(3.29)
LN_ANALYSTS	-0.004***	-0.004***	-0.004***	-0.004	-0.004	-0.004
	(-5.41)	(-5.21)	(-5.35)	(-0.67)	(-0.63)	(-0.71)
CHANGE SALES	-0.012***	-0.012***	-0.012***			
	(-6.30)	(-6.40)	(-6.20)			
CHANGE EPS				0.002	0.002	0.002
				(0.91)	(0.86)	(0.90)
Industry-FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year-FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	12,577	12,577	12,577	12,577	12,577	12,577
R-squared	0.1700	0.1698	0.1688	0.0422	0.0422	0.0422

This table presents estimates from OLS regressions in order to test association between analyst' forecast error and ESG. The dependent variable is *ERROR SALES* (*ERROR EPS*), the analysts' sales (EPS) forecast error. E,S,G represents each pillar tested individually: *ENVPERF* is the score of Environmental Performance, *SOCIALPERF* is the Social Performance and *GOVPERF* is the Corporate Governance Performance retrieved from the Thomson Reuters Refinitiv. *SIZE* is the natural logarithm of end of year total assets. *LEVERAGE* is the end of year total leverage scaled by end of year total assets. *LOSS* is a dummy variable, which equals one for firm-year observations if net income is lower than 0, and zero otherwise. *CHANGE SALES* (*CHANGE EPS*) is the relative change of sales (EPS) realized in the reported year in comparison with the previous year. *RETURN ON EQUITY* is the earnings before interest and tax scaled by end of year total equity. *BOOK TO MARKET* is the book value of equity scaled by end of year total market value of equity. *LN_ANALYSTS* is the natural logarithm of one plus the total number of analysts following. The *t*-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The standard-error is clustered at firm-level (Petersen, 2009).

4.3. Additional and Robustness Analyses

We proceed with a battery of additional and robustness tests to add and confirm our main results. First, to complement our main analysis, we regress firms' sales and EPS, both scaled by total assets, on *ESG PERFORMANCE* (untabulated), by additionally considering all control variables from Equation (1). We find that the coefficient of *ESG PERFORMANCE* is positive and significant (non-significant) in firms' sales (EPS) estimation. Those findings are in line with the theoretical discussion proposed, by suggesting that firms more involved in ESG practices in fact seem to have higher levels of sales, while this greater ESG engagement does not seem to be reflected in higher levels of EPS.

Table 7. Robustness and Additional Analysis

Panel A – Two-dimensional cluster adjustment

	ERROR SALES	ERROR EPS
Constant	0.010	0.156
	(1.03)	(5.23)
ESG PERFORMANCE	-0.014***	-0.009
	(-3.66)	(-0.40)
Control Variables	Yes	Yes
Industry-FE	N/A	N/A
Year-FE	N/A	N/A
Observations	12,577	12,577
R-squared	0.1718	0.0421

Panel B – Forecasts in one-, two-, and three-year ahead

	ERROR SALES_F1	ERROR SALES_F2	ERROR SALES_F3	ERROR EPS_F1	ERROR EPS_F2	ERROR EPS_F3
Constant	0.045***	0.047***	0.035***	0.196***	0.167***	0.189***
	(8.71)	(8.01)	(6.33)	(4.33)	(3.30)	(3.50)
ESG PERFORMANCE	-0.008***	-0.009***	-0.007***	0.006	0.021	-0.010
	(-4.23)	(-4.05)	(-2.90)	(0.40)	(1.26)	(-0.55)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,725	8,652	6,838	10,725	8,652	6,838
R-squared	0.1386	0.1419	0.1746	0.0231	0.0319	0.0519

Panel C – Firm-fixed effects

	ERROR SALES	ERROR EPS
Constant	0.036***	0.174***
	(7.65)	(4.60)
ESG PERFORMANCE	-0.012***	0.010
	(-6.56)	(0.74)
Control Variables	Yes	Yes
Industry-FE	N/A	N/A
Year-FE	Yes	Yes
Observations	12,577	12,577
R-squared	0.1718	0.0421

This table presents estimates from OLS regressions in order to test association between analyst' forecast error and ESG. The dependent variable is *ERROR SALES* (*ERROR EPS*), the analysts' sales (EPS) forecast error. *ESG Practice* is the combined score from the E, S and G pillars from the Thomson Reuters Refinitiv ESG measure. Control variables as described in Appendix A. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. The standard-error is clustered at firm-level (Petersen, 2009).

Second, in order to confirm our main empirical findings, we follow previous accounting quality literature (e.g., Lara et al., 2020; Kim et al., 2012; Biddle et al., 2009) and apply a two-dimensional cluster adjustment at the firm and year level in *t*-statistics related to the variables' coefficients included in Equation (1), instead of clustering standard error only at firm-level. The results are presented in Table 7, Panel A. We find a negative and significant (non-significant) coefficient at conventional levels for *ESG PERFORMANCE* in *ERROR SALES* (*ERROR EPS*) estimations, confirming our main empirical findings presented in Table 4.

Third, following Muslu et al. (2019) and Dhaliwal et al (2012), we additionally look at analysts' forecasts error standing for one- (*ERROR SALES_F1* and *ERROR EPS_F1*), two-

12

(*ERROR SALES_F2* and *ERROR EPS_F2*), and three-year (*ERROR SALES_F3* and *ERROR EPS_F3*) ahead. The results are presented in Table 7, Panel B. We consistently find a negative and significant (non-significant) coefficient for all the three future *ERROR SALES* (*ERROR EPS*). Those findings suggest that firms' involvement with ESG initiatives seems to help analysts predict future revenues (i.e., up to three years ahead), while not helping them to predict future EPS.

Fourth, we also estimate Equation (3) by including firm-fixed effects (see Table 7, Panel C). Once again, we find the same results as those presented in Table 4, confirming our main empirical findings. Finally, we substitute the mean for the median value of sales (EPS) to calculate analysts' consensus forecast (untabulated). The results are still robust and qualitatively similar to those presented in Table 4.

5. Conclusion

We examine the role of ESG performance on analysts' forecasts error. Our results suggest that ESG performance is incorporated in sales forecasts, but no (or weak) evidence that ESG performance reflects an improvement on EPS forecasts. We shed some new light on the growing demand to the understanding of the ESG effects in the information environment and how analysts incorporate this information on their sales and EPS forecasts.

Our findings contribute to the debate about the consequences of ESG on firms' performance. Moreover, the findings show that information intermediaries like analysts would benefit from the transparency of the related ESG costs to be used as input in their financial modeling, since the error of EPS forecasts is higher than the error for Sales forecasts.

Our findings are relevant for several reasons. First, our findings show the importance of ESG to firm operations, that is sales. In addition, it also shows that while ESG performance improves sales, at the moment, it also leads to additional costs that can weigh down on the incremental benefit (higher sales). Second, it also shows the impact of firms' ESG performance rather than mere disclosure. Our paper documents the real impact of ESG performance and shows that the three aspects of ESG are equally important in driving the benefits of ESG. Third, our results are important to firms that want to manage their ESG performance and want to drive a lasting impact from ESG. Fourth, our results are also important to regulators; knowing that ESG performance drives real benefits are important but allowing firms to manage incremental costs is equally important.

References

Alareeni, B. A., & Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. Corporate Governance: *The International Journal of Business in Society, 20*(7), 1409-1428.

Ali, A., Liu, M. H., Xu, D., & Yao, T. (2012). Corporate disclosure, analyst forecast dispersion, and stock returns. Available at SSRN: http://ssrn.com/abstract=556704

Batae, O. M., Dragomir, V. D., & Feleagă, L. (2021). The relationship between environmental, social, and financial performance in the banking sector: A European study. *Journal of Cleaner Production, 290*, 125791.

Berg, Florian and Kölbel, Julian and Rigobon, Roberto, Aggregate Confusion: The Divergence of ESG Ratings (August 15, 2019). Available at SSRN: https://ssrn.com/abstract=3438533

Bhat, G., Hope, O.-K. and Kang, T. (2006), Does corporate governance transparency affect the accuracy of analyst forecasts? *Accounting & Finance*, 46: 715-732.

Biddle, G. C., Hilary, G., & Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency? *Journal of accounting and economics, 48*(2-3), 112-131.

Bloomberg Professional Services (2021). ESG assets may hit $53 trillion by 2025, a third of global AUM. https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/.

Bofinger, Y., Heyden, K. J., & Rock, B. (2022). Corporate social responsibility and market efficiency: Evidence from ESG and misevaluation measures. *Journal of Banking & Finance, 134*, 106322.

Bose, S., Ali, M. J., Hossain, S., & Shamsuddin, A. (2021). Does CEO–Audit Committee/Board Interlocking Matter for Corporate Social Responsibility? *Journal of Business Ethics*, 1-29.

Byard, D., Li, Y., & Weintrop, J. (2006). Corporate governance and the quality of financial analysts' information. *Journal of Accounting and Economics*, 25, 609–625.

Cormier, D., & Magnan, M. (2014). The impact of social responsibility disclosure and governance on financial analysts' information environment. *Corporate Governance, 14*(4), 467-484.

Dhaliwal, D. S., Radhakrishnan, S., Tsang, A., & Yang, Y. G. (2012). Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. *The Accounting Review, 87*(3), 723-759.

Dittmar, A., & Thakor, A. (2007). Why do firms issue equity? *The Journal of Finance, 62*(1), 1-54.

Drempetic, S., Klein, C., & Zwergel, B. (2020). The influence of firm size on the ESG score: Corporate sustainability ratings under review. *Journal of Business Ethics, 167*(2), 333-360.

Gangi, F., Mustilli, M., Daniele, L. M., & Coscia, M. (2022). The sustainable development of the aerospace industry: Drivers and impact of corporate environmental responsibility. *Business Strategy and the Environment, 31*(1), 218-235.

Garcia, A. S., Mendes-Da-Silva, W., & Orsato, R. J. (2017). Sensitive industries produce better ESG performance: Evidence from emerging markets. *Journal of Cleaner Production, 150*, 135-147.

García Lara, J. M., García Osma, B., & Penalva, F. (2011). Conditional conservatism and cost of capital. *Review of Accounting Studies, 16*(2), 247-271.

García Lara, J. M., Garcia Osma, B., & Penalva, F. (2014). Information consequences of accounting conservatism. *European Accounting Review, 23*(2), 173-198.

Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance, 66*, 101889.

Glaum, M., Baetge, J., Grothe, A., & Oberdörster, T. (2013). Introduction of international accounting standards, disclosure quality and accuracy of analysts' earnings forecasts. *European Accounting Review, 22*(1), 79-116.

Ioannou, I., & Serafeim, G. (2015). The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strategic Management Journal, 36*(7), 1053-1081.

Kim, Y., Park, M. S., & Wier, B. (2012). Is earnings quality associated with corporate social responsibility? *The accounting review, 87*(3), 761-796.

Kim, J., Cho, K., & Park, C. K. (2019). Does CSR assurance affect the relationship between CSR performance and financial performance? *Sustainability, 11*(20), 5682.

Krasodomska, J., & Cho, C. H. (2017). Corporate social responsibility disclosure: Perspectives from sell-side and buy-side financial analysts. *Sustainability Accounting, Management and Policy Journal, 8*(1), 2-19.

Lara, J. M. G., Osma, B. G., & Penalva, F. (2020). Conditional conservatism and the limits to earnings management. *Journal of Accounting and Public Policy*, 39(4), 106738.

Lee, C., Palmon, D., & Yezegel, A. (2018). The corporate social responsibility information environment: Examining the value of financial analysts' recommendations. *Journal of Business Ethics, 150*(1), 279-301.

Lee, C., Chung, K. H., & Yang, S. (2016). Corporate Governance and the Informational Efficiency of Prices. *Financial Management*, 45(1), 239–260.

Liang, L., & Riedl, E. J. (2014). The effect of fair value versus historical cost reporting model on analyst forecast accuracy. *The Accounting Review, 89*(3), 1151-1177.

Luo, X., Wang, H., Raithel, S., & Zheng, Q. (2015). Corporate social performance, analyst stock recommendations, and firm future returns. *Strategic Management Journal, 36*(1), 123-136.

14

Muslu, V., Mutlu, S., Radhakrishnan, S., & Tsang, A. (2019). Corporate social responsibility report narratives and analyst forecast accuracy. *Journal of Business Ethics, 154*(4), 1119-1142.

Navex Global (2021). Environmental, Social and Governance (ESG) global survey conducted by NAVEX Global reveals strong adoption across public and private companies. https://www.navexglobal.com/en-gb/company/press-room/environmental-social-governance-global-survey-reveals-strong-adoption-across-public-private-companies

Ng, A. C., & Rezaee, Z. (2015). Business sustainability performance and cost of equity capital. *Journal of Corporate Finance, 34*, 128-149.

Orens, R., & Lybaert, N. (2007). Does the financial analysts' usage of non-financial information influence the analysts' forecast accuracy? Some evidence from the Belgian sell-side financial analyst. *The International Journal of Accounting, 42*(3), 237-271.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies, 22*(1), 435-480.

Reber, B., Gold, A., & Gold, S. (2021). ESG disclosure and idiosyncratic risk in Initial Public Offerings. *Journal of Business Ethics*, 1-20.

Refinitiv (2022). *An overview of Environmental, Social and Corporate Governance*. Available at <https://www.refinitiv.com/en/financial-data/company-data/esg-data>.

Shleifer, A., & Vishny, R. (1997). A survey of corporate governance. *The Journal of Finance, 52*(2), 737-783.

Siew, R. Y., Balatbat, M. C., & Carmichael, D. G. (2016). The impact of ESG disclosures and institutional ownership on market information asymmetry. *Asia-Pacific Journal of Accounting & Economics, 23*(4), 432-448.

Stolowy, H., & Paugam, L. (2018). The expansion of non-financial reporting: an exploratory study. *Accounting and Business Research, 48*(5), 525-548.