CHAPTER 7

ESG, COE and Profitability in the Oil and Gas Sector

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Introduction

It is nowadays clear that ESG issues concern most of the business choices in a transversal way to all sectors of activity, and there is no doubt that the Oil and Gas sector is the most impacted one by the need for an unavoidable energy transition towards the production of clean energy, which has to be in line with the objectives of containing greenhouse gas emissions (GHG).

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The Oil and Gas industry has, as it is well known, peculiar aspects, such as: (a) It operates on natural resources with high environmental impacts and risks; (b) It has an international dimension; (c) It is strongly influenced by geopolitical factors; (d) It has a high technological content and it requires high investments; (e) It has a long-term production cycle (even over 30 years) and (f) It is influenced by the performance of financial markets and commodities.

Therefore, for oil companies, especially the larger ones, the transformation from Big Oil to Big Energy represents a complex, sensitive and long-term process, with choices on sustainable investments to be planned considering their own economic and financial balance. Investors have to monitor this process very carefully, balancing short-term performance expectations with the goal of ensuring a growth in value over time to their assets (Filippetti, 2019; Tamburi Investment Partners, 2017). Which is to say, in the Oil and Gas sector—and especially in the Upstream sector—ESG-oriented policies and investments.

For these reasons, this chapter empirically explores Oil and Gas sector, trying to investigate the effect of ESG Scores on (1) Cost of equity (COE) and (2) Firm's profitability (FP) for a sample of 182 operating global companies belonging to this industry between 2002 and 2018.

As we already know, the ESG Scores are synthetic indicators which are based respectively on environmental, social and governance aspects and practices which influence and shape the behaviour of firms.

Although corporate finance has historically researched about the determinants of stock returns and modelling future yields, recently corporate governance has focussed its attention on measuring the impact of non-financial information on listed companies' financial performance. This field of study has become more relevant over time due to the increasing attention of investors.

In fact, a large growing literature is nowadays investigating to what extent sustainable strategies affect both firm's performance and value.[1] Needless to say, the challenge is to verify whether considering sustainability, environmental and social issues also payoffs in terms of performance and added value to the firm.

Very briefly, there is a recently blossoming literature on both theoretical and empirical evidences related to Sustainability Performance and

[1] For an in-depth analysis on both theoretical and empirical literature, see Chapter 6.

the Cost of Equity (El Ghoul et al., 2018; Sharfman & Fernando, 2008; Suto & Takehara, 2017). Whether it is reasonable to say that ESG strategies of firms do contribute to the establishment of a more sustainable business context as envisioned in Waddock (2017), there are substantial doubts about the role of ESG in shaping both profitability and firm value (Dowell et al., 2000; Hart & Ahuja, 1996; Konar & Cohen, 2001; Lee et al., 2018). Some of the recent studies supporting the argument that a better Sustainability Performance generates a reduction in the Cost of Equity (Dhaliwal et al., 2014; Gupta, 2018; Matthiesen & Salzmann, 2017).

The sample of analysis is composed of firms of different dimensions. The majority of the firms composing the sample are characterized by size dimensions that range from 1 to 60 billion US dollars of market capitalization, meanwhile a smaller part, have a market capitalization that exceeds 60 billion US dollars. Analysing the sample from a geographical point of view, the greatest part of them is headquartered in the United States, Canada and Continental Europe.

While other scholars use well-known models such as the CAPM or the Fama and French Model, the added value of our work lays in the use of implied cost of equity measured according to Easton Model (Easton, 2004).

More specifically, in the first analysis we estimate firms' ex-ante cost of equity adopting Easton Model (2004), which expresses the share price in terms of one-year-ahead expected dividend per share and one and two-year-ahead expected earnings per share. The ESG Scores used for this study are drawn from Thomson Reuters Datastream,[2] which considers more than 180 industry-relevant sustainability variables that successively are aggregated into ten main E, S, and G components. By employing a fixed effect regression model and a parsimonious set of control variables, we show that firms with higher ESG Scores exhibit cheaper equity financing. In particular, our findings suggest that for a ten percent increase in the ESG Overall Score, the cost of equity of firms declines by 134 bps. Among other findings we underline that this relationship is not linear, instead, it has a U-shaped form. This means that greater attention towards ESG topics is beneficial for firms until they

[2] Datastream considers more than 180 industry-relevant sustainability variables that successively are aggregated into ten main E, S and G components.

reach a "threshold" in terms of size measured by total assets. Afterwards the relationship becomes positive.

For the second analysis instead, we consider Return on Assets as a proxy for firm's profitability and use the same dataset as in the previous analysis. We show that better ESG performance is negatively related with Return on Assets. In specific, in the presence of a ten percent increase in the overall ESG Score the Return on Assets of firms in our dataset declines by 0.45%. The same non-linear, U-shaped form, relationship persists also in the profitability analysis.

The obtained results of this empirical research are in line with the literature, supporting the argument that a better Sustainability Performance generates a reduction in the Cost of Equity (Dhaliwal et al., 2014; Gupta, 2018; Matthiesen & Salzmann, 2017). For both analyses, COE and FP, we employ a semi-logarithmic fixed effect regression model implementing various robustness tests in order to check whether the same effects hold in more recent times (2010–2018/2019) when the availability of data is greater and considering different firms' size.

Data and Empirical Strategy

Given the peculiarities of the Oil and Gas sector and its extended exposure towards ESG topics, we are interested to check whether the scores attributed to the ESG profile of firms is reflected on their cost of equity and in their profitability. To do so we construct a dataset composed of Oil and Gas producing firms that operate worldwide and compute the following two analyses:

A. ESG scores and Cost of Equity
B. ESG scores and Firms Profitability

The time period considered spans from 2002 to 2018 and is chosen in order to incorporate the largest and most reliable set of ESG scores. Several criteria were applied in creating the dataset: (i) only firms whose ESG scores were available for more than five years were considered and (ii) these firms ought to have analyst coverage in order to obtain up to two years of forecasted earnings and dividend per share for the valuation models. This selection process led to the construction of a panel

Table 7.1 Sample distribution by market capitalization (billion US$)

Market capitalization	*Number of firms*
0–1	42
1–5	53
5–10	22
10–20	20
20–30	12
30–60	18
60–100	8
100–200	3
+200	4
Total number of firms	**182**

This table shows the sample distribution based on firms' size measured by market capitalization. The largest numbers of firms in the sample belong to the range of market capitalization of 1–5 billion US$

Source Thomson Reuters Datastream; Authors' elaboration

composed of 182 firms of different dimensions operating in the Oil and Gas sector which was used for both analyses (Tables 7.1 and 7.2).

The ESG scores are taken from the data provider Thomson Reuters Datastream which captures and calculates over 400 company-level

Table 7.2 Sample distribution by geographic area

Geographic area	*Number of firms*
North America and Canada	86
Continental Europe	23
Asia	18
Pacific Asia	18
United Kingdom	12
Oceania	10
Scandinavian Europe	9
Latin America	5
Middle East	1
Total number of firms	**182**

This table presents the composition of the sample based on geographic area. The majority of firms in the sample are represented by North American and Canadian firms, followed by Continental European companies and Asian ones

Source Thomson Reuters Datastream; Authors' elaboration

measures, of which they select a subset of 178 most comparable and relevant fields to power the overall company assessment and scoring process. The underlying measures are based on considerations around comparability, data availability and industry relevance. They are grouped into ten categories, weighted proportionally to the count of measures within each category formulates the final ESG score, which reflects the company's ESG performance, commitment and effectiveness based on publicly reported information. These scores range from 0 to 100 where a greater score means greater commitment towards ESG topic. The categories that compose the Environmental Score are: (1) Resource Use score, measures the commitment of a company to reduce the use of energy, water and materials and to introduce more eco-efficient solutions by enriching the supply chain management; (2) Emissions Reduction score, represents the commitment and the effectiveness of the reduction of environmental emission in the operational processes and (3) Innovation score, takes account of the company's capacity to reduce the environmental costs for its customers by creating new market opportunities through the use of new environmental technologies and eco-friendly designed products. The categories composing the Social Score are: (1) Workforce score, represents a company's commitment to guarantee job satisfaction, a healthy and safe workplace, supporting diversity and equal opportunities; (2) Human Rights score, quantifies a company's effectiveness in respecting the fundamental human rights conventions; (3) Community score, represents the attempts of the firm in being a good citizen, contributing into public health and respecting business ethics and (4) Product responsibility score, reflects company's capacity to guarantee quality goods and services integrating the customer's health and safety, integrity and data privacy. The Governance Score captures: (1) Management score, represents a company's commitment to follow best practice corporate governance principles; (2) Shareholders score, reflects the effectiveness regarding equal treatment of shareholders and the use of anti-takeover devices and (3) CSR Strategy score, comprehends the practices a company applies with the scope of integrating the economic-financial, social and environmental dimensions into its decision-making process (Table 7.3).

In addition, variables to control for financial peculiarities, which differ moving from the COE analysis and the FP analysis were used. Regarding the COE analysis which considers the cost of equity calculated using

Table 7.3 Descriptive statistics ESG scores of firms composing the sample

ESG score components	*Obs*	*Mean*	*Std. Dev*	*Min*	*Max*
ESG overall score	2,114	56.395	17.426	1.098	92.915
Resource use score	2,114	58.665	27.509	0.224	99.797
Emissions score	2,114	58.657	27.571	0.276	99.798
Environmental Innovation Score	2,114	52.401	24.660	0.202	99.795
Human rights score	2,114	55.998	25.682	14.722	99.747
Community score	2,114	55.708	29.304	14.722	99.798
Workforce score	2,114	58.346	27.583	0.202	99.796
Product responsibility score	2,114	55.337	26.650	0.234	99.798
Management Score	2,114	55.497	29.110	0.505	99.950
Shareholders score	2,114	54.220	27.526	0.526	99.924
CSR strategy score	2,114	58.830	27.470	0.051	99.843

Source Thomson Reuters Datastream; Authors' elaboration

Table 7.4 Descriptive statistics independent and control variables for both analysis

	Obs	*Mean*	*Min*	*Max*
COE	3.074	0.113	0	1.717
ROA	2.921	0.046	−2.428	0.837
Total assets[a]	2.937	28.401	0.199	440.901
Leverage	2.937	0.702	−80.904	122.335
Market to book value	2.719	2.134	−178.940	81.780
Long-term growth estimate	2.016	14	−183	177

[a]Millions of US dollars
Source Thomson Reuters Datastream; Authors' elaboration

Easton's model as an independent variable,[3] the control variables are as follows: (i) Firms size measured by total assets; (ii) Long-term growth rate; (iii) Market to book value and (iv) Time trend variable. For what concerns the FP analysis which uses Return on Assets (ROA) as a proxy for profitability instead, the control variables employed are: (i) Firms size measured by total assets; (ii) Financial leverage; (iii) Market to book value and (iv) One-year lagged profitability measure (ROA) (Table 7.4).

[3] See Appendix A of this chapter.

ESG Scores and Cost of Equity: COE Analysis

In order to analyse the relationship between ESG scores and firm's Cost of Equity, we employ the following fixed effect regression model:

$$\text{Cost of Equity}_{it} = \alpha + \beta_1 \log \text{ESG}_{it} + \beta_{n+1} \log \text{Control Variables}_{it} + \text{Time Trend}_{it} + \varepsilon_{it}$$

The choice to consider the implied cost of equity is supported by El Ghoul et al. (2011) and Dhaliwal et al. (2011, 2014) who show that both the standard single-factor model and the Fama and French (1993) three-factor model provide poor proxies for the cost of equity. Hail and Leuz (2011) and Chen et al. (2009) argue that the implied cost of capital approach is particularly useful because it makes an explicit attempt to isolate cost of capital effects from growth and cash flow effects, as occurs for the more generally used ex-post models based on realized returns. The output of Easton model (2004) represents the final measure of COE in our analysis. This model allows the share price to be expressed in terms of one-year-ahead earnings per share forecasts. The explicit forecast horizon is set to two years, after which forecasted abnormal earnings are assumed to grow in perpetuity at a constant rate. The model requires positive one-year-ahead and two-year-ahead earning forecast.

The valuation equation of the Easton Model (2004) is given by:

$$P_0 = \frac{\text{eps}_2 + \text{COE} * \text{dps}_2 - \text{eps}_1}{\text{COE}^2}$$

$$\text{COE} = \frac{\sqrt{\text{eps}_{2+}\text{COE} * \text{dps}_2 - \text{eps}_1}}{P_0}$$

where eps_1 and eps_2 are the forecasted values of earnings per share in time $t + 1$ and $t + 2$ and dps_2 is the forecasted dividend per share in time $t + 2$. The data employed in the above equations are forecast data obtained by I.B.E.S. database, part of Thomson Reuters Datastream.

The above equation generates two results, only the positive outputs were considered and subsequently implemented into to regression model. All the necessary diagnostic tests were taken, confirming the fixed effect regression model as the best fit. The obtained results are as presented in Table 7.5.

Table 7.5 Results of COE analysis

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emissions score*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSRstrategy score*
Model	*5.1*	*5.2*	*5.3*	*5.4*	*5.5*	*5.6*	*5.7*	*5.8*	*5.9*	*5.10*	*5.11*
Beta coefficient	**−0.14112***	−0.0171	−0.0091	−0.0772	**−0.0426****	0.0242	0.0183	**−0.0533***	0.0046	−0.0429	- **0.0626****
	(0.0778)	(0.0204)	(0.0149)	(0.0953)	(0.0190)	(0.0792)	(0.0369)	(0.0320)	(0.0275)	(0.0426)	(0.0254)
Total assets	−0.6198	−0.6042	−0.6096	−0.7632	−0.5564	−0.6143	−0.6160	−0.7010	−0.6189	−0.5726	−0.5651
	(0.4910)	(0.4972)	(0.4875)	(0.5683)	(0.4902)	(0.4889)	(0.4979)	(0.5009)	(0.4972)	(0.4671)	(0.4872)
Total assets^2	0.0196	0.0189	0.0191	0.0240	0.0174	0.0191	0.0193	0.0220	0.0194	0.0178	0.0178
	(0.0158)	(0.0160)	(0.0157)	(0.0182)	(0.0157)	(0.0157)	(0.0159)	(0.0160)	(0.0159)	(0.0150)	(0.0156)
Long-term growth	0.0569	0.0579	0.0577	0.0556	0.0542	0.0571	0.0569	0.0571	0.0580	0.0591	0.0613
	(0.0351)	(0.0350)	(0.0351)	(0.0357)	(0.0353)	(0.0357)	(0.0350)	(0.0350)	(0.0354)	(0.0347)	(0.0356)
Market to book value	0.0412	0.0381	0.0388	0.0330	0.0423	0.0389	0.0381	0.0417	0.0381	0.0418	0.0405
	(0.0400)	(0.0396)	(0.0397)	(0.0406)	(0.0397)	(0.0395)	(0.0394)	(0.0406)	(0.0398)	(0.0402)	(0.0401)
No. observations	699	699	699	699	699	699	699	699	699	699	699

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of a regression that considers Cost of Equity (COE) as dependent variable and the component of ESG score as main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Long-Term Growth, Market to Book Value; Time Trend. The employed models are in a half-logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (COE) is not.

Source Thomson Reuters Datastream; Authors' elaboration

As the results show, we detect a statistically significant negative association between COE and ESG. Overall Score there is a 134.5 bps[4] reduction in the cost of equity of firms that operate in the Oil and Gas sector. Looking more in detail into the components of each factor we obtain robust results for the Social and Governance factors. In specific there is a decrease of around 60 bps and 40.6 bps for every ten percent increase in the Product Responsibility score and in the Workforce score, respectively. Regarding the Governance factor we find a 50.8-bps decrease in COE deriving from greater scores of CSR Strategy.

Among the control variables we included the quadratic term of the firm's size measure (Total Assets) which plays the role of a simple robustness test seeking for a non-linear relationship between the ESG scores and the dependent variables. Results are puzzled and suggest the existence of non-linearities in the relationship we are investigating. In specific, the relation between COE and ESG scores is characterized by a U-shaped form. The impact of greater ESG performance is negatively related to the cost of equity of firms until the size of the firm reaches a certain level, afterwards the relation becomes positive.

To confirm the robustness of our results we computed various robustness test by (i) decreasing the years of observation, (ii) removing the 20 largest companies and (iii) removing the 20 smallest companies in the sample (Tables 7.7, 7.8, 7.9 in Appendix B). The results obtained are in line with our findings confirming once again the negative association between the variables.

ESG Scores and Firms Profitability: FP Analysis

In order to analyse the relation between the profitability and ESG performance we use a dataset that contains the same firms as previously and employ the following half-logarithmic fixed effect regression model:

$$\mathrm{ROA}_{it} = \alpha + \beta_1 \log \mathrm{ESG\,Score}_{it} + \beta_{n+1} \log \mathrm{Control\,Variables}_{it} + \beta_{n+2}\mathrm{ROA}_{i,t-1} + \varepsilon_{it}$$

[4] Since the regressions are in a half-logarithmic form, the results are read as follows: Quantitative effect = β*log (1.10).

The dependent variable is the Return on Asset (ROA), computed as the ratio between net income and total assets. We also employ a parsimonious set of control variables established in the existing literature: size variable, leverage variable, market performance measure and past profitability.

Table 7.6 reports the results. The overall ESG Score does exhibit a statistically significant negative association with ROA. This means that for a ten percent variation of the ESG score, the profitability of the firm measured by ROA reduces by 0.45%. Analysing in detail each component, from the Environmental factor we find evidence that the Resource Use score is negatively related to firm's profitability. The same type of relation is found also for the subcategories composing the Social factor: Community score and Workforce score. The negative association persists also for the Governance factor captured by CSR Strategy score and Shareholders score.

Repeating the same approach as in the COE analysis, we add the quadratic term of the size measure and we obtain the same non-linear relationship in a U-shaped form.

Also, in the FP analysis we compute the robust test by reducing the observation years into 2010–2018 and excluding from the sample firstly the 20 biggest firms and successively the 20 smallest firms. The robustness of our model is confirmed since we obtained the same type of relationship between the ESG scores and the profitability measure (see Tables 7.10, 7.11, 7.12 in Appendix C). It is interesting to note that when we consider the sample which excludes the 20 smallest firms, we observe a non-linear relationship but, in this case, it has an inverse U-shaped form suggesting that the efficiency of these sustainability measures is strictly related with firm's size.

Conclusions

This work focussed on the impact of ESG scores on Cost of Equity and Firms' Profitability of a panel of 182 global listed firms operating in the Oil and Gas sector over the period between 2002 and 2018. Our main findings highlight that:

i. The overall ESG score is negatively associated with Cost of Equity of firms, measured by the Easton Model. When the ESG score increases by ten percent the Cost of Equity decreases by 134 bps.

Table 7.6 Results of FP analysis

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emissions score*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSRstrategy score*
	6.1	*6.2*	*6.3*	*6.4*	*6.5*	*6.6*	*6.7*	*6.8*	*6.9*	*6.10*	*6.11*
Coefficient	**−0.0479*** **	**−0.0094** **	−0.0072	−0.0003	**−0.0071***	−0.0094	**−0.0094** **	−0.0036	−0.0059	**−0.0061** **	**−0.0084** **
	(0.0141)	(0.0038)	(0.0051)	(0.0032)	(0.0037)	(0.0104)	(0.0037)	(0.0055)	(0.0063	(0.0029)	(0.0042)
Total assets	−0.0657	−0.0783	−0.0742	−0.0803	−0.0726	−0.0842	−0.0745	−0.0841	−0.0771	−0.0715	−0.0752
	(0.1021)	(0.1005)	(0.0978)	(0.1003)	(0.1009)	(0.1007)	(0.0997)	(0.1017)	(0.1030)	(0.0985)	(0.1012)
Total assets^2	0.0018	0.0021	0.0019	0.0021	0.0002	0.0022	0.0019	0.0022	0.0020	0.0018	0.0019
	(0.0031)	(0.0306)	(0.0030)	(0.0031)	(0.0031)	(0.0031)	(0.0030)	(0.0031)	(0.0031)	(0.0030)	(0.0031)
Market to book value	0.0456	0.0461	0.0465	0.0464	0.0463	0.0461	0.0462	0.0465	0.0465	0.0465	0.0460
	(0.0112)	(0.0112)	(0.0112)	(0.0112)	(0.0112)	(0.0113)	(0.0117)	(0.0112)	(0.0112)	(0.0112)	(0.01129
Leverage	−0.0386	−0.0388	−0.0391	−0.0395	−0.0391	−0.0390	−0.0388	−0.0391	−0.0392	−0.0392	−0.0391
	(0.0076)	(0.0077)	(0.0078)	(0.0078)	(0.0078)	(0.0077)	(0.0078)	(0.0078)	(0.0078)	(0.0078)	(0.0078)
ROA (t − 1)	0.0665	0.0731	0.0739	0.0774	0.0745	0.0767	0.0727	0.0767	0.0766	0.0764	0.0748
	(0.0554)	(0.0568)	(0.0577)	(0.0569)	(0.0562)	(0.0569)	(0.0571)	(0.0570)	(0.0566)	(0.0567)	(0.0564)

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emissions score*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSRstrategy score*
	6.1	*6.2*	*6.3*	*6.4*	*6.5*	*6.6*	*6.7*	*6.8*	*6.9*	*6.10*	*6.11*
No. observations	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of a regression that considers Return on Assets (ROA) as a dependent variable and the component of ESG score as a main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Financial Leverage, Market to Book Value; Past Profitability (ROA lagged one period). The employed models are in a half-logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (ROA) and the past profitability measure are not

Source Thomson Reuters Datastream; Authors' elaboration

ii. Same inverse association holds for Workforce score, Product Responsibility score and CSR Strategy score.
iii. We find that these negative associations are characterized by a non-linear U-shaped relationship.
iv. The firms' profitability measured by ROA is negatively related to better performance of ESG scores.
v. We obtain statistically significant results for the overall ESG Score suggesting that for a ten percent increase in the ESG score, there is a decrease in the ROA of around 0.45%.
vi. Statistically significant results derive from the subcategories of the Social factor (Community score and Workforce score) and Governance factor (CSR Strategy score and Shareholders score) which show a negative association with ESG scores.
vii. The relationship between firms' profitability and ESG scores is non-linear and is characterized by a U-shape form.

Our findings support arguments in the literature that firms with better ESG performance have higher value and lower risk (Chen et al., 2009; El Ghoul et al., 2011, 2018; Hail & Leuz, 2011) and in the same time highlight some peculiarities deriving from industry-level factors (Gregory et al., 2016; Reverte, 2012). In term of future research, we would like to expand our analysis in other sectors in order to check whether the degree of materiality of ESG scores changes among different industries and different value chains. Moreover, notwithstanding the relatively short period taken into analysis and the choice of ROA as a proxy for firm's profitability, the use of other corporate variables like Tobin Q, may eventually add innovative evidence in the dynamic of Oil and Gas industry.

Generally speaking, only in the last part of the period considered in this study (from 2002 to 2018) the awareness of the urgent need for ESG-oriented choices in the Oil and Gas sector has emerged.

The turning point was undoubtedly 2015, with the Paris agreements on climate change and the signing, by 193 countries, of the UN Agenda for Sustainable Development: an action plan that has defined the three dimensions of development (economic, environmental and social) in 17 Sustainable Development Goals (SDGs) to be achieved by 2030.

All the majors in the sector are now committed to give an increasingly rapid impulse to ESG-oriented policies and investments, and the need to

find a fair balance between the interests of shareholders and stakeholders represents the decisive challenge for the future of these companies.

It is particularly interesting in the case of ENI, one of the majors in the sector, which, since 2014, has embarked on a process of transformation of its business model through a decarbonization process oriented towards carbon neutrality in the long term, with huge investment plans in in the diffusion of renewable sources.

This new approach has found an innovative disclosure tool in the adoption of a long-term strategic plan, from 2020 to 2050, announced to the market in February 2020, which combines the goals of continuous development in a rapidly evolving market, such as the Energy one, with a significant reduction in the carbon footprint of the portfolio. It is a plan with stated objectives, which are punctually defined and articulated in an accurate timeline, and, therefore, measurable and verifiable.

ENI is an example of how the main companies in the Oil and Gas sector are finalizing their investments towards environmentally sustainable objectives, which, however, must be combined with the economically sustainable ones, which, at least in the short and medium term, represent the traditional business model.

Therefore, it arises the need to monitor and detect what the company performance resulting from this new scenario will be in the near future, which will certainly be subject to careful evaluation by investors. To allow the market the possibility of evaluating the correlations in a homogeneous way between ESG scores and financial and economic performance, it will be necessary to arrive at uniform metrics also in terms of ESG.

A recent step forward in this direction is represented by the signing, in September 2020, by 61 leaders of the most important companies in the world, including members of the World Economic Forum (WEF), of the fundamentals of the "Stakeholder Capitalism Metrics" issued by the International Business Council (IBC). These metrics offer a set of universal and comparable information focussed on people, planet and governance, about which companies, investors and all the various stakeholders can rely on, regardless of the sector or country in which they operate.

Further interesting development in the field of metrics is the one proposed by Mark Kramer in a recent publication,[5] in which, in reiterating the need for ESG indexes, in their calculation, not to be completely

[5] Kramer (2020) Hybrid metrics—Connecting shared value to shareholder value. *The Harvard Business Review*.

disconnected from the purely financial aspects of corporate performance, he indicates that the most suitable tool for this purpose is the use of "hybrid metrics" that can combine the social and environmental impact of companies with their standard financial performance measures.

Appendix A

Eatson Model

The model is based on the recognition of the central role of short-term forecasts of earnings in valuation. The roles of (1) forecasts of next period's accounting earnings, (2) forecasts of accounting earning two-period ahead and (3) expected accounting earnings beyond the two-year forecast horizon. The model shows how the difference between accounting earnings and economic earnings characterizes the role of accounting earnings in valuation.

Starting with the no-arbitrage assumption:

$$P_0 = (1 + R)^{-1}[P_1 + \mathrm{DPS}_1] \tag{7.1}$$

where:

P_0 = current, date $t = 0$, price per share;

P_1 = expected, date $t = 1$, price per share;

DPS_1 = expected dividends per share, at date $t = 1$;

R = expected rate of return and $R > 0$ is a fixed constant. Adding and subtracting capitalized accounting yields:

$$P_0 = \frac{\mathrm{EPS}_1}{R} - \frac{\mathrm{EPS}_1}{R} - (1 + R)^{-1}[P_1 + \mathrm{DPS}_1] \tag{7.2}$$

If expected accounting earnings EPS_1 is equal to economic earnings ($P_0 * R$), then the term in the brackets must equal to zero—in other words, next period's expected earnings are sufficient for valuation. However, if EPS_1 does not equal economic earnings then valuation based on accounting earnings requires forecasts beyond the next period.

$$P_1 = \frac{\mathrm{EPS}_2}{R} - \frac{\mathrm{EPS}_2}{R} - (1 + R)^{-1}[P_2 + \mathrm{DPS}_2] \tag{7.3}$$

Substituting Eq. (7.3) into Eq. (7.2) yields:

$$P_0 = \frac{EPS_1}{R} - (1+R)^{-1}\text{agr}_1 + (1+R)^{-2}R^{-1}[R * \text{DPS}_2 - (1+R)\text{EPS}_2] + (1+R)^{-2}P_2 \tag{7.4}$$

where

$$\text{agr}_1 = [\text{EPS}_2 + R * \text{DPS}_1 - (1+R)\text{EPS}_1] \tag{7.5}$$

is the expected abnormal growth in accounting earnings. This abnormal growth in earnings reflects the effects of generally accepted accounting practices that lead to a divergence of accounting earnings from economic earnings. If EPS_1 and EPS_2 were equal to economic earnings, then agr_1 would be zero and the ratio of expected earnings to price would be equal to the expected rate of return.

The valuation role of expected accounting earnings beyond the two-year forecast horizon may be seen by substituting for P_2, P_3, P_4, *etc.*, in Equation (7.5) to yield:

$$P_t = \frac{\text{EPS}_1}{R} + R^{-1}\sum_{t=1}^{\infty}(1+R)^{-1}\text{agr}_t \tag{7.6}$$

Equation (7.6) shows that the present value of the agr_t sequence explains the difference between price and capitalized expected earnings. Equation (7.6) may be modified to accommodate a finite forecast horizon by defining a perpetual rate of change in abnormal growth in earnings (Δagr) beyond the forecast horizon. If earnings forecasts are available for two periods, Equation (7.6) may be written as:

$$P_0 = \frac{\text{EPS}_1}{R} + \frac{\text{agr}_1}{(R - (R - \Delta\text{agr}))} \tag{7.7}$$

where:

$$\Delta\text{agr} = \left(\frac{\text{agr}_{t+1}}{\text{agr}}\right) \tag{7.8}$$

Considering the special case $\Delta\text{agr} = 0$, meaning that $\text{agr}_1 = \text{agr}_2 = \ldots$, from Eq. (7.7) we have:

$$P_0 = \frac{\text{EPS}_2 + R * \text{DPS}_2 - \text{EPS}_1}{R^2}$$

$$R = \sqrt{\frac{[\mathrm{EPS}_2 + R * \mathrm{DPS}_2 - \mathrm{EPS}_1]}{P_0}}$$

Appendix B

See Tables 7.7, 7.8, and 7.9.

Appendix C

See Tables 7.10, 7.11 and 7.12.

Table 7.7 Result of COE analysis—robust test: excluding 20 biggest firms from the sample

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emissionsscore*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSR strategy score*
	A.1	*A.2*	*A.3*	*A.4*	*A.5*	*A.6*	*A.7*	*A.8*	*A.9*	*A.10*	*A.11*
Coefficient	**−0.1581***	−0.0150	−0.0114	−1.1533	**−0.0425****	−0.0089	0.0034	−0.0453	0.0134	−0.0536	**−0.0582****
	(0.0851)	(0.0243)	(0.0157)	(0.1333)	(0.0199)	(0.0869)	(0.0369)	(0.0328)	(0.0283)	(0.0526)	(0.0261)
Total assets	−0.0457	−0.3920	−0.4013	−0.6891	−0.3536	−0.4241	−0.4113	−0.4980	−0.3922	−0.4250	−0.3772
	(0.5133)	(0.5258)	(0.4997)	(0.7506)	(0.4954)	(0.5155)	(0.0524)	(0.5034)	(0.5059)	(0.5006)	(0.5018)
Total assets^2	0.0146	0.0123	0.0126	0.0219	0.0111	0.0133	0.0129	0.0157	0.0123	0.0133	0.0119
	(0.0164)	(0.0167)	(0.0159)	(0.0242)	(0.0158)	(0.0165)	(0.0167)	(0.0159)	(0.0160)	(0.0159)	(0.0160)
Long-term growth	0.0683	0.0698	0.0695	0.0652	0.0656	0.0696	0.0694	0.0685	0.0703	0.0693	0.0741
	(0.0425)	(0.0424)	(0.0424)	(0.0439)	(0.0428)	(0.0427)	(0.0424)	(0.0424)	(0.0429)	(0.0426)	(0.0434)
Market to book value	0.0495	0.0457	0.4631	0.0362	0.0501	0.0453	0.0455	0.0488	0.0450	0.0508	0.0474
	(0.0409)	(0.0404)	(0.0406)	(0.0419)	(0.0407)	(0.0403)	(0.0402)	(0.0414)	(0.0406)	(0.0405)	(0.0411)
No. observations	598	598	598	598	598	598	598	598	598	598	598

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of regressions that considers Cost of Equity (COE) as dependent variable and the ESG scores as main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Long Term Growth, Market to Book Value; Time Trend. The employed models are in a half-logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (COE) is not

Source Thomson Reuters Datastream; Authors' elaboration

Table 7.8 Result of COE analysis—robust test: excluding 20 smallest firms from the sample

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emissions score*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSR strategy score*
	B.1	*B.2*	*B.3*	*B.4*	*B.5*	*B.6*	*B.7*	*B.8*	*B.9*	*B.10*	*B.11*
Coefficient	**−0.1668****	−0.0162	−0.0080	−0.0779	**−0.0436****	0.0341	0.0107	**−0.0664***	−0.0062	−0.0448	**−0.0601****
	(0.0811)	(0.0208)	(0.0149)	(0.0963)	(0.0208)	(0.0807)	(0.0391)	(0.0343)	(0.0271)	(0.0433)	(0.0254)
Total assets	−0.7791	−0.7544	−0.7709	−0.9568	−0.7310	−0.7583	−0.7842	−0.8810	−0.7960	−0.7218	−0.7430
	(0.6458)	(0.6576)	(0.6401)	(0.7369)	(0.6421)	(0.6417)	(0.6497)	(0.6544)	(0.6485)	(0.6154)	(0.6416)
Total assets^2	0.2433	0.0234	0.0239	0.0297	0.0226	0.0234	0.0243	0.0273	0.0247	0.0222	0.0231
	(0.0202)	(0.0206)	(0.0201)	(0.0231)	(0.0201)	(0.0201)	(0.0203)	(0.0204)	(0.0203)	(0.0193)	(0.0201)
Long-term growth	0.0584	0.0600	0.0598	0.0574	0.0556	0.0592	0.0594	0.0590	0.0596	0.0614	0.0631
	(0.0368)	(0.0366)	(0.0366)	(0.0374)	(0.0371)	(0.0371)	(0.0365)	(0.0366)	(0.0369)	(0.0362)	(0.0371)
Market to book value	0.0477	0.0455	0.0462	0.0403	0.0497	0.0476	0.0462	0.0494	0.0463	0.0497	0.0476
	(0.0442)	(0.0442)	(0.0441)	(0.0452)	(0.0441)	(0.0440)	(0.0442)	(0.0449)	(0.0442)	(0.0446)	(0.0443)
No. observations	657	657	657	657	657	657	657	657	657	657	657

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of regressions that considers Cost of Equity (COE) as dependent variable and the ESG scores as main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Long Term Growth, Market to Book Value; Time Trend. The employed models are in a half-logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (COE) is not

Source Thomson Reuters Datastream; Authors' elaboration

Table 7.9 Result of COE analysis—robust test: period 2010–2018

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emissions score*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSR strategy score*
	C.1	*C.2*	*C.3*	*C.4*	*C.5*	*C.6*	*C.7*	*C.8*	*C.9*	*C.10*	*C.11*
Coefficient	**−0.3694***	−0.0667	−0.0431	−0.1816	−0.0618	0.0936	0.0044	**−0.1724****	0.0330	−0.0933	**−0.1411****
	(0.1983)	(0.0432)	(0.0542)	(0.1573)	(0.0483)	(0.1631)	(0.0967)	(0.0775)	(0.0536)	(0.0819)	(0.0627)
Total assets	−0.1798	−1.9206	−1.9392	−2.1564	−1.9105	−2.0656	−2.0138	−2.0355	−2.0580	−1.9075	−1.8575
	(1.2035)	(1.2293)	(1.2114)	(1.3646)	(1.4892)	(1.1935)	(1.2191)	(1.1683)	(1.2164)	(1.2547)	(1.2946)
Total assets^2	0.0585	0.0621	0.0627	0.0700	0.0617	0.0661	0.0649	0.0666	0.0662	0.0614	0.0602
	(0.0392)	(0.0400)	(0.0394)	(0.0449)	(0.0388)	(0.0390)	(0.0396)	(0.0386)	(0.0396)	(0.0377)	(0.0416)
Long term growth	0.0854	0.0888	0.0894	0.0860	0.0846	0.0883	0.0894	0.0932	0.0906	0.0937	0.0975
	(0.0462)	(0.0469)	(0.0456)	(0.0467)	(0.0450)	(0.0463)	(0.0459)	(0.0457)	(0.0459)	(0.0451)	(0.0463)
Market to book value	0.2076	0.1964	0.1988	0.1847	0.2005	0.1960	0.1977	0.2248	0.1963	0.2096	0.2008
	(0.0962)	(0.0959)	(0.0959)	(0.0985)	(0.0961)	(0.0971)	(0.0960)	(0.0986)	(0.0963)	(0.0969)	(0.0959)
No. observations	504	504	504	504	504	504	504	504	504	504	504

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of regressions that considers Cost of Equity (COE) as dependent variable and the ESG scores as main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Long Term Growth, Market to Book Value; Time Trend. The employed models are in a half-logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (COE) is not

Source Thomson Reuters Datastream; Authors' elaboration

Table 7.10 Result of FP analysis—robust test: excluding 20 biggest firms from the sample

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emissions score*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSR strategy score*
	D.1	*D.2*	*D.3*	*D.4*	*D.5*	*D.6*	*D.7*	*D.8*	*D.9*	*D.10*	*D.11*
Coefficient	**−0.0429*** **	**−0.0103*** **	−0.0057	−0.0009	**−0.0057***	−0.0102	**−0.0104*** **	−0.0046	−0.0039	**−0.0061** **	**−0.0076** **
	(0.0134)	(0.0040)	(0.0045)	(0.0044)	(0.0031)	(0.0100)	(0.0035)	(0.0053)	(0.0054)	(0.0029)	(0.0036)
Total assets	−0.0941	−0.0934	−0.0921	−0.0932	−0.0879	−0.0987	−0.0947	−0.0969	−0.0952	−0.0920	−0.0882
	(0.0832)	(0.0812)	(0.0804)	(0.0805)	(0.0819)	(0.0828)	(0.0829)	(0.0819)	(0.0794)	(0.0803)	(0.0819)
Total assets^2	0.0028	0.0027	0.0026	0.0026	0.0025	0.0028	0.0027	0.0027	0.0027	0.0025	0.0025
	(0.0026)	(0.0026)	(0.0026)	(0.0025)	(0.0026)	(0.0026)	(0.0026)	(0.0026)	(0.0025)	(0.0025)	(0.0026)
Market to book value	0.0372	0.0368	0.0373	0.0370	0.0372	0.0367	0.0372	0.0373	0.0373	0.0373	0.0368
	(0.0084)	(0.0084)	(0.0085)	(0.0085)	(0.0084)	(0.0085)	(0.0085)	(0.0084)	(0.0083)	(0.0084)	(0.0084)
Leverage	−0.0325	−0.0322	−0.0326	−0.0325	−0.0326	−0.0324	−0.0323	−0.0326	−0.0327	−0.0327	−0.0325
	(0.0071)	(0.0071)	(0.0072)	(0.0072)	(0.0072)	(0.0072)	(0.0072)	(0.0072)	(0.0072)	(0.0072)	(0.0072)
ROA ($t-1$)	0.1990	0.2118	0.2154	0.2172	0.2128	0.2153	0.2115	0.2152	0.2129	0.2146	0.2135
	(0.0446)	(0.4395)	(0.0436)	(0.0434)	(0.0430)	(0.0431)	(0.0437)	(0.0441)	(0.0439)	(0.0436)	(0.0439)
No. observations	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,693

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of regressions that considers Return on Assets (ROA) as dependent variable and the ESG scores as main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Financial Leverage, Market to Book Value; Past Profitability (ROA lagged one period). The employed models are in a half-logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (ROA) and the past profitability measure are not

Source Thomson Reuters Datastream; Authors' elaboration

Table 7.11 Result of FP analysis—robust test: excluding 20 smallest firms from the sample

	ESG	*Environmental*			*Social*				*Governance*		
	ESG Score	*Resource use score*	*Emissions score*	*Environmental innovation score*	*Work-force score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Share-holders score*	*CSR strategy score*
	E.1	*E.2*	*E.3*	*E.4*	*E.5*	*E.6*	*E.7*	*E.8*	*E.9*	*E.10*	*E.11*
Coefficient	**−0.0323*** **	**−0.0007** **	−0.0035	0.0013	−0.00233	−0.0128	**−0.0070*** **	−0.0011	**−0.0077*** **	−0.0034	**−0.0093*** **
	(0.0114)	(0.0031)	(0.0036)	(0.0017)	(0.0027)	(0.0081)	(0.0027)	(0.0047)	(0.0026)	(0.0021)	(0.0035)
Total assets	0.0120	0.0056	0.0048	0.0039	0.0063	−0.0021	0.0096	0.0024	0.0058	0.0083	0.0052
	(0.0420)	(0.0401)	(0.0396)	(0.0391)	(0.0397)	(0.0417)	(0.0413)	(0.0405)	(0.0391)	(0.0396)	(0.0418)
Total assets^2	−0.0008	−0.0007	−0.0007	−0.0007	−0.0007	−0.0004	−0.0008	−0.0006	−0.0007	−0.0008	−0.0007
	(0.0013)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0013)	(0.0013)	(0.0012)	(0.0012)	(0.0012)	(0.0013)
Market to book value	0.0239	0.0236	0.0237	0.0236	0.0237	0.0232	0.0235	0.0236	0.0239	0.0237	0.0233
	(0.0069)	(0.0069)	(0.0069)	(0.0069)	(0.0069)	(0.0069)	(0.0070)	(0.0068)	(0.0068)	(0.0069)	(0.0069)
Leverage	−0.0290	−0.0289	−0.0290	−0.0291	−0.0290	−0.0289	−0.0289	−0.0290	−0.0292	−0.0291	−0.0291
	(0.0071)	(0.0071)	(0.0072)	(0.0072)	(0.0072)	(0.0071)	(0.0072)	(0.0716)	(0.0072)	(0.0072)	(0.0071)
ROA ($t-1$)	0.2219	0.2317	0.2339	0.2356	0.2334	0.2354	0.2321	0.2353	0.2321	0.2342	0.2305
	(0.0523)	(0.0513)	(0.0511)	(0.0507)	(0.0505)	(0.0512)	(0.0508)	(0.0513)	(0.0512)	(0.0508)	(0.0503)
No. observations	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of regressions that considers Return on Assets (ROA) as dependent variable and the ESG scores as main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Financial Leverage, Market to Book Value; Past Profitability (ROA lagged one period). The employed models are in a half- logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (ROA) and the past profitability measure are not

Source Thomson Reuters Datastream; Authors' elaboration

Table 7.12 Result of FP analysis—robust test: period 2010–2018

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emission score*	*Environmental innovation score*	*Workforce score*	*Human rights score*	*Community score*	*Product responsibility score*	*Management score*	*Shareholders score*	*CSR strategy score*
	F.1	*F.2*	*F.3*	*F.4*	*F.5*	*F.6*	*F.7*	*F.8*	*F.9*	*F.10*	*F.11*
Coefficient	**−0.0531*** **	**−0.0144** **	−0.0034	−0.0012	−0.0052	−.0091	**−0.0136** **	−0.0054	−0.0038	**−0.0062***	**−0.0130***
	(0.0204)	(0.0064)	(0.0084)	(0.0053)	(0.0060)	(0.0114)	(0.0063)	(0.0057)	(0.0094)	(0.0037)	(0.0055)
Total assets	−0.0425	−0.0581	−0.0558	−0.0595	−0.0532	−0.0598	−0.0625	−0.0625	−0.5450	−0.0530	−0.0522
	(0.1214)	(0.1188)	(0.1157)	(0.1179)	(0.1195)	(0.1179)	(0.1203)	(0.1191)	(0.1239)	(0.1162)	(0.1195)
Total assets^2	0.0021	0.0025	0.0024	0.0025	0.0023	0.0025	0.0026	0.0026	0.0024	0.0023	0.0023
	(0.0039)	(0.0039)	(0.0038)	(0.0038)	(0.0039)	(0.0038)	(0.0039)	(0.0039)	(0.0040)	(0.0038)	(0.0039)
Market to book value	0.0358	0.0361	0.0369	0.0366	0.0364	0.0367	0.0358	0.0370	0.0367	0.0367	0.0359
	(0.0131)	(0.0130)	(0.0132)	(0.0130)	(0.0131)	(0.0130)	(0.0128)	(0.0129)	(0.0130)	(0.0130)	(0.0130)
Leverage	−0.0501	−0.0503	−0.0511	−0.0512	−0.0511	−0.0510	−0.0504	−0.0512	−0.0512	−0.0514	−0.0509
	(0.0097)	(0.0097)	(0.0098)	(0.0099)	(0.0099)	(0.0098)	(0.0098)	(0.0098)	(0.0099)	(0.0098)	(0.0098)
ROA ($t-1$)	0.0685	0.0776	0.0804	0.0806	0.0787	0.0797	0.0803	0.0790	0.0789	0.0795	0.0757
	(0.0433)	(0.0425)	(0.0436)	(0.0436)	(0.0433)	(0.0439)	(0.0439)	(0.0442)	(0.0439)	(0.0437)	(0.0434)

	ESG	*Environmental*			*Social*				*Governance*		
	ESG score	*Resource use score*	*Emission score*	*Environmental innovation score*	*Work-force score*	*Human rights score*	*Community score*	*Product responsi-bility score*	*Management score*	*Share-holders score*	*CSR strategy score*
	F.1	*F.2*	*F.3*	*F.4*	*F.5*	*F.6*	*F.7*	*F.8*	*F.9*	*F.10*	*F.11*
No. observa-tions	1337	1337	1337	1337	1337	1337	1337	1337	1337	1337	1337

***, **, * stand for statistical significance at 1%, 5% and 10%, respectively

This table presents the results obtained by employing a half-logarithmic fixed effect regression model with clustered robust errors. Each column contains the output of regressions that considers Return on Assets (ROA) as dependent variable and the ESG scores as main independent variable. The clustered robust errors are presented in brackets. The control variables employed into the model are: Total assets; Financial Leverage, Market to Book Value; Past Profitability (ROA lagged one period). The employed models are in a half-logarithmic form: all the control variables and the main explanatory variable (ESG score) are in logarithmic form meanwhile the dependent variable (ROA) and the past profitability measure are not

Source Thomson Reuters Datastream; Authors' elaboration

References

Chen, K., Chen, Z., & Wei, K. (2009). Legal protection of investors, corporate governance, and the cost of equity capital. *Journal of Corporate Finance, 15*(3), 273–389.

Dhaliwal, D. S., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review, 86*(1), 59–100.

Dhaliwal, D., Li, O. Z., Tsang, A., & Yang, Y. G. (2014). Corporate social responsibility disclosure and the cost of equity capital: The roles of stakeholder orientation and financial transparency. *Journal of Accounting Public Policy, 33*(4), 328–355.

Dowell, G., Hart, S., & Yeung, B. (2000). Do corporate global environmental standards create or destroy market value? *Management Science, 46*(8), 1013–1169.

Easton, P. D. (2004). PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital. *The accounting review, 79*(1), 73–95.

El Ghoul, S., Guedhami, O., Kim, H., & Park, K. (2018). Corporate environmental responsibility and the cost of capital: International evidence. *Journal of Business Ethics, 149*(2), 335–36126.

El Ghoul, S., Guedhami, O., Kwok, C. C. Y., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance, 35*(9), 2388–2406.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stock and bonds. *Journal of Financial Economics, 33*, 3–56.

Filippetti, S. (2019). *I signori del lusso.* Sperling & Kupfer.

Gregory, A., Whittaker, J., & Yan, X. (2016). Corporate social performance, competitive advantage, earnings persistence and firm value. *Journal of Business Finance & Accounting, 43*(1), 3–30.

Gupta, K. (2018). Environmental sustainability and implied cost of equity: International evidence. *Journal of Business Ethics, 147*(2), 343–365.

Hail, L., & Leuz, C. (2011). *Cost of capital effects and changes in growth expectations around U.S. cross-listings* (ECGI - Finance Working Paper No. 46/2004, Wharton Financial Institutions Center Working Paper Series #06-19).

Hart, S. L., & Ahuja, G. (1996). Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment, 5*(1), 30–37.

Konar, S., & Cohen, M. A. (2001). Does the market value environmental performance? *Review of Economics and Statistics, 83*(2), 281–289.

Lee, J., Graves, S. B., & Waddock, S. (2018). Doing good does not preclude doing well: Corporate responsibility and financial performance. *Social Responsibility Journal, 14*(4), 768–781.

Matthiesen, M.-L., & Salzmann, A. J. (2017). Corporate social responsibility and firms' cost of equity: How does culture matter? *Cross Cultural & Strategic Management, 24*(1), 105–124.

Reverte, C. (2012). The impact of better corporate social responsibility disclosure on the cost of equity capital. *Corporate Social Responsibility and Environmental Management, 19*(5), 253–272.

Sharfman, M. P., & Fernando, C. S. (2008). Environmental risk management and the cost of capital. *Strategic Management Journal, 29*(6), 569–592.

Suto, M., & Takehara, H. (2017). CSR and cost of capital: Evidence from Japan. *Social Responsibility Journal, 13*(4), 798–816.

Tamburi Investment Partners. (2017). *Prezzi & valori. L'enterprise value nell'era digitale. Borsa, private equity, M&A, premi, sconti, errori e prospettive*. Class Editori.

Waddock, S. (2017). Inequality, dignity and the sustainability challenge. *Journal of Management for Global Sustainability, 5*(1), 63–83.