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Abstract

The company's sustainability is an important factor for a portfolio's asset allocation. The increasing attention it receives has led to a proliferation of criteria and rating agencies, resulting in significant divergences among ESG scores and methodologies. Based on a sample of 139 companies in the food and beverage sector, this research investigates, first, the impact of ESG score on the financial performance, using three different ESG scores from three different data providers (Refinitiv, Bloomberg and Truvalue Labs). Our outcomes show a positive and significant relationship between ESG score and financial performance across all three selected data providers. Secondly, this paper investigates any divergences in the evaluation process, and if so, which factors determine these discrepancies. Divergencies are analyzed both in terms of rating scores and in terms of methodologies and procedures. Our evidence shows that the main differences are in the score methodology, in the weights assignment to pillars and in the selection of the criteria on which the evaluation is based.

Keywords: ESG Score, Sustainability, Financial Performance, ESG Rating Agencies, Score Divergence, Food and Beverage Sector

JEL: G11, M14, Q56, C55, G30

1 Introduction

Up until a recent past, investing looked like analysing the financial variables of companies in the market to build portfolios that were balanced from a risk-return point of view. It appeared like an exclusive matter of figures. Something has changed quite recently. In addition to these financial factors, qualitative variables have been added to the analysis, and they have been encapsulated in the acronym *ESG* (*Environmental, Social and Governance*). It is a matter of considering, in the selection and construction of investment portfolios, also non-financial data, namely environmental, social and governance data to evaluate not only *Corporate Financial Performance (*CFP), but also *Corporate Social Performance* (CSP). Although the literature has not yet reached unanimity regarding the definition of CSP, a substantial part of the literature defines it as a "*composite, multidimensional construct capturing a business organization's configuration of principles of social responsibility, process of social responsiveness, and policies, programs, and observable outcomes as they relate to the firm's social relationships"* (Ioannou and Serafeim, 2012, p. 837). Investors, who operate according to this *framework*, are identified as sustainable investors and the investment activity, characterized in this way, is called *Socially Responsible Investment* (SRI). From our standpoint ESG do represent a more holistic representation of risk.

The ESG market is relatively new. This definition was formally coined in early 2004, when Kofi Annan, at that time UN General Secretary and some financial institutions published the text "*Who Cares Wins: Connecting Financial Markets to a Changing World*" (World Bank Group and Kofi Annan, 2004), urging investors all over the world to integrate sustainability aspects into their financial analyses and investment strategies. Its current relevance has been determined over time by social and cultural changes which have modified the cultural approach of many investors. The financial crisis of 2008 highlighted the importance of social and governance aspects which play an important role as economic and financial ones. Some social issues that are currently strongly debated such as gender diversity, discrimination, equality of professional growth opportunities, personal and professional fulfilment have become key criteria when evaluating the commitment of sustainability of a society. But above all, it is the climate change and the most recent damages caused by the human activity that have completely changed the perspective of all of us, even in the financial world.

In 2020, the ESG market managed $35.3 trillion in assets, registering an increase of 14.38% in the previous two years and of 53.5% in the previous four years, representing 36% of total assets under management (Global Sustainable Investment Association Report, 2020). According to Bloomberg (Henze and Boyd, 2022), assuming a growth of 15%, or rather a third of the growth registered in the last five years, assets in the ESG market may exceed $50 trillion by 2025. According to a report of the Organization for Economic Co-operation and Development published in 2020, in the United States, the level of sustainable investments in 2020 was higher than 20% of all professionally managed assets, totalizing $11 trillion. In Europe, the ESG industry has been valued $17 trillion. Over the years, sustainable investing has become increasingly popular among retail investors to the point that, from 2012 to 2020, the launch of ESG funds increased from 140 to 564 (Boffo and Patalano, 2020).

According to recent market surveys (Boffo and Patalano, 2020), institutional investors are inclined to take into consideration sustainability criteria in their portfolio choices to achieve greater returns and benefits in terms of risk management, while retail investors are interested in the underlying environmental and social values, with younger generations being more sensitive. According to another market survey published in 2019 by BNP, which was destined for institutional investors and asset managers, 52% of the respondents includes ESG criteria in their decision-making processes because of the potential of higher long-term returns. The other 47% identifies reputation and brand image (Boffo and Patalano, 2020) as the main reasons.

Companies are evaluated since ESG criteria by rating agencies. It is estimated that there are 70 different agencies and ESG data provider on the market. But there is a general lack of transparency on how ratings are given, and which are the criteria. The explanation is that each agency develops and applies different evaluation methods, bases its own evaluation process on different ESG criteria providing in this way different weights to the pillars. These differences are justified by differentiation strategy on the market, by building its own market identity and by cultural and ideological reasons (Berg et al., 2022).

The aim of this paper is to better understand the differences in ESG ratings and the sources of these divergencies, by taking into consideration three different ratings agencies, which are Bloomberg[1], Refinitiv[2] and Truvalue Labs[3]. The analysis focuses on the global food and beverage sector and is based on a sample of 139 publicly listed companies operating in various countries. The sample includes firms from 32 countries across (e.g., North America, Europe, and Asia), and the analysis covers the period from 2008 to 2022**.** Before proceeding, it is crucial to determine whether there is any relationship between the ESG rating and the financial performance of a company, and if so, what type of relationship exists. For this reason, an OLS regression has been implemented between the financial performance, proxied by Tobin's Q, and the ESG rating issued by each of the three rating agencies considered in this study.

Our outcomes show a consistent positive and significant relationship between the ESG rating and the financial performance which is consistently observed across all three rating agencies. Furthermore, through the calculation of the variance, it has been possible to conduct an analysis of the resulting divergencies, based on the quantitative comparison of the scores to understand how wide the numerical distance is for the same company. To better understand what the main reasons of such divergencies are, each evaluation method has been analysed, to underline crucial elements and key factors. It is possible to classify the major differences in three categories: i) differences of ESG criteria based on which the score is given, ii) differences of weights assigned to each pillar (E, S and G), iii) mathematical and methodological differences.

The remainder of the paper is organized as follows: in Section 2, we analyse the previous literature on ESG divergencies. Section 3 presents the sample, describes the specification model and the implemented methodology. Section 4 shows the results obtained. Section 5 goes into details in the divergencies analysis and,

[1] www.bloomberg.com
[2] www.refinitiv.com
[3] www.factset.com

finally, Section 6 compares and discusses the methods of the three rating agencies, highlighting the major differences and concludes.

It is possible to identify two fields in the literature: the first one is focused on understanding whether a relation between the *Corporate Social Performance* and the *Corporate Financial Performance* does exist and, if it so, what kind of relation is that. The literature is very extensive on this topic, and the scholars have also reached different results: a minority of studies have concluded that there is a negative relationship between ESG and CFP. For example, a study conducted on a group of British companies (Brammer et al, 2008) has revealed a negative correlation between equity returns and environmental performance and, to a lesser extent, between the former variable and social activities, over a period of one to three years. Most studies concluded that although there is no systematic causal relationship between social engagement and higher equity returns, positive social performance has a positive or neutral effect on risk-adjusted equity returns, profitability and other financial measures at the firm and portfolio level (Oikonomou et al. 2012, Friede et al. 2015). However, it is not clear by what mechanism this correlation shows itself: it could result from the improvement of the relationship with *stakeholders* and customers or even from compliance, regulation or the risk of litigation. Other interpretations (Armour et al 2018, Godfrey et al 2009, Husted 2005) witness the positive attitude of CSR companies as a sort of insurance against negative events which can seriously compromise the company's reputation; another possibility is that CSR (Corporate Social Responsibility) is a proxy for the quality of the management at least in non-controversial industries (Benabou and Tirole 2009, Schanzenbach and Sitkoff 2019), which makes better decisions, in a more reasoned and strategic way (Pollman, 2019).

The second field of the literature focuses on understanding if there is consistency in the sustainability rating market or, quite the opposite, if it is possible to identify differences on various levels. The most noticed flaws of the ESG market are as follows: i) lack of transparency in the way rating agencies report their own methodologies, ii) commensurability which means that ESG rating agencies may measure the same concept in different ways, iii) lack of principles of standardisation both in defining ESG criteria and in reporting non-financial information which is the major problem that the ESG market are facing right now (Escrig-Olmedo et al 2019, Kotsantonis et al 2019). More specifically, there are quite a lot of principles of standardisation reported from different organisation, but they are applied on a discretionary basis or mandatory only in a few jurisdictions. This aspect will be better organised by an extensive utilization of AI in due course. The result is that companies may report different evidence or the same evidence in a different way. Two studies are briefly presented: Berg et al (2022) have broken up the total divergencies into the components that cause them, and it results that 38% of the total divergencies is due to different scopes, 56% due to different measurement methods and the other 6% due to different weights assigned to the pillars. Billio et al (2020) have analysed nine of the biggest ESG data provider on the market and the main cause of the divergences in the scores is the different number of criteria and indicators on which the evaluation is based (see Table 1). Different criteria do convey different philosophical perspectives and hermeneutical approaches to the economic and financial environment.

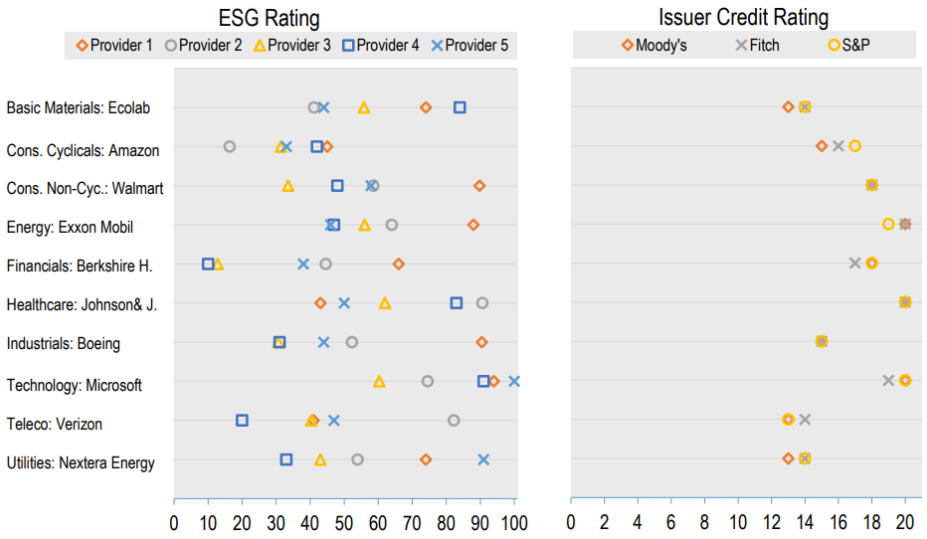
Table 1: number of ESG indicators for agency

ESG Rating Agency	Number of indicators
MSCI	37
Vigeo-Eiris	38
Refinitiv	178
Sustainalytics	155
ISS Oekom	100
RobecoSAM	74
ECPI	80/86
Bloomberg	120
FTSE Russell	300

Source: elaboration by the authors

An interesting argument is comparing the ESG rating market with the other important rating market which is the credit rating market (Berg et al, 2022). Just as credit rating agencies evaluate companies based on their creditworthiness, so do ESG rating agencies whose assessment criterion is ESG performance. Despite this, there are at least three important differences between the two types of ratings. The first is the definition of the valuation criterion: while creditworthiness is relatively objectively defined as the probability of default, there is no unambiguous definition of ESG. The second difference is that the market of credit rating was born in the last century and has reached a significant level of convergence and homogeneity over time, while the ESG rating market is new and still in its embryonic phase. Moreover, there are no international standards for ESG disclosure, and if there are, they are applied on a discretionary basis or mandatory just in a few jurisdictions. There is a high degree of discretion about which information must be published and in which way. The result of these first two differences is an empirically demonstrated divergence in the ESG rating that is much more pronounced than the one found in the credit rating (which it has 99% of correlation). To demonstrate this thesis, Boffo and Patalano (2020) selected ten companies on the market for which it compared the ESG rating assigned to them by 5 different providers (identified as provider 1, provider 2 ...) with the credit rating assigned by Moody's, Fitch and S&P. The chart in Figure 1 shows a greater dispersion in the ESG market than the one observed in the credit market: on the left, valuations are very different for the same company, while one the right, valuations converge and sometimes even coincide.

Figure 1: ESG rating and Credit rating,



Source: OECD, 2020

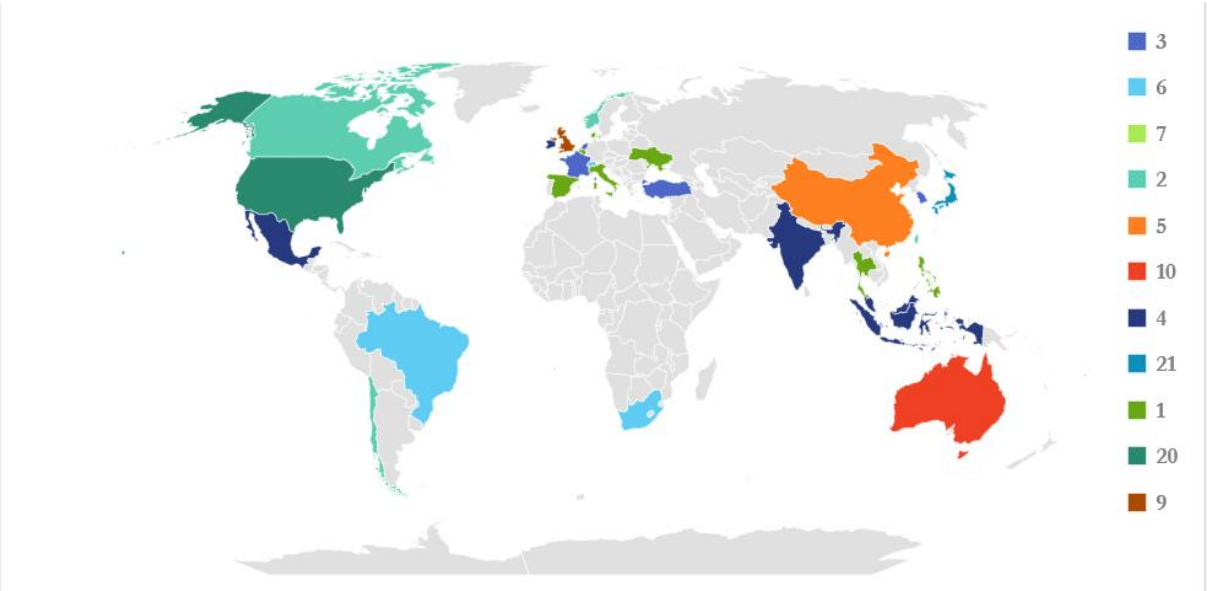
Moreover, ESG rating agencies are paid by the investors who use these ratings in their investment strategies and not by the rated companies. On the credit market, it happens exactly the opposite. This is a strong point of the ESG market because it means that there is no influence on the rating provided by the companies themselves.

2 Data and Methodology

We did choose "food and beverage" sector because it is an industry in which sustainability does matter a lot, and it is strictly connected with wellness, nutrition and prosperity of the future generation. Moreover, food and beverage, like bread and wine, are in the deepest being of western and middle east culture and religious beliefs. The sample was constructed using Refinitiv's database[4]. There are 139 companies in the sample, distributed all over the world. The geographical distribution of the sample is shown in Figure 2, while Table 2 shows the number of observations (or companies) per country and the corresponding percentage of the total. The two countries that weigh most heavily on the sample are Japan (14.39%) and United States (14.39%), followed by Australia (7.19%). From Figure 2, it is easy to see the absence of food and beverage companies in Africa, Eastern Europe, and Asia (except for East Asia).

[4]Refinitiv, website: www.refinitiv.com

Figure 2: Geographical distribution of the sample



Source: elaboration by the authors

Table 2: Geographical distribution of the sample, number of observations per country and percentage

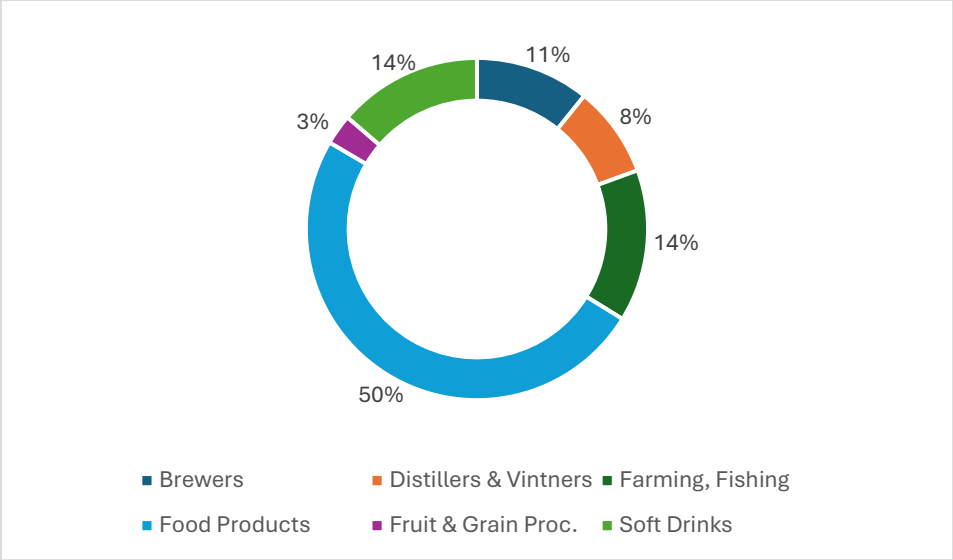
Country	Number of companies	Percentage of the total
France	3	2,16
Brazil	6	4,32
Hong Kong	7	5,04
Canada	2	1,44
China	5	3,60
Australia	10	7,19
Ireland	4	2,88
India	4	2,88
Indonesia	4	2,88
Japan	20	14,39
Mexico	4	2,88
Malaysia	3	2,16
Switzerland	6	4,32
Norway	2	1,44
South Africa	6	4,32
South Korea	3	2,16
Netherlands	3	2,16
Singapore	2	1,44

Other Eastern European	1	0,72
Philippines	1	0,72
Spain	1	0,72
Ukraine	1	0,72
United States	20	14,39
United Kingdom	9	6,47
Thailand	1	0,72
Taiwan	2	1,44
Cayman Islands	1	0,72
Turkey	3	2,16
Belgium	1	0,72
Denmark	1	0,72
Italy	1	0,72
Chile	2	1,44
Total of observations	**139**	**100**

Source: elaboration by the authors

The food and beverage sector can be divided into sub sectors as follows: Brewers, Distillers & Vintners, Soft Drinks, Food Products, Farming & Fishing, and Fruit & Grain Processing. Figure 3 shows the sub sectors in a pie chart with the corresponding percentage of the total.

Figure 3: Chart representing sub sectors of the food and beverage sector



Source: elaboration by the authors

As above-mentioned, the sample is composed of 139 companies, and the observation period runs from 2008 to 2022. We chose 2008 as the starting point because, until then, there was a lack of available information about ESG data. This structure qualifies the dataset as a *panel* because the observations refer to multiple subjects for multiple time periods (15 years).

The model's construction followed the research of Servaes and Tamayo (2013) as well as that of Aouadi and Marsat (2016). Both studies adopted as a proxy measure of companies' financial performance, Tobin's Q, introduced by Tobin (1969). There are various ways to calculate it, but it always represents the company's ability to create value with its assets. We do use Tobin's Q, and no other profitability measures because it is a long-term measure and not a short-term one. In fact, it is reasonable to think that a company is willing to use resources to develop a communicative and well-designed CSR strategy, disadvantaging current profitability, if in the long-term this has a positive impact on the value of the company. Tobin's Q represents, in the model, the dependent variable, while the independent variable is the ESG score issued by the selected data providers. The other independent control variables are the following: the natural logarithm of the assets, the leverage (debt-to-assets ratio) and the dividend yield.

The regression model is the follow:

$$\ln\text{Tobin's } Q_{it} = \alpha + \beta_1 \text{ESGscore}_{it-1} + \beta_1 \text{ESGscore\_SQ}_{it-1} + \beta_2 \text{Size}_{it-1} + \beta_4 \text{Leverage}_{it-1} + \beta_4 \text{DividendYield}_{it-1} + \varepsilon_{it}$$

The variables have been downloaded from DataStream[5] and are defined as follows:

1. *Tobin's Q*: it is a proxy of the financial performance of a company, proposed by Tobin (1969)[6]. Refinitiv defines the Tobin's Q as the ratio between the company's market value and the book value of its assets. As above-mentioned, Tobin's Q has the advantage of being a long-term measure of the company's ability to turn its assets into market value. In fact, it is reasonable to think that a company is willing to use resources in developing a CSR strategy, disadvantaging current profitability, if in the long-term this has a positive impact on the value of the company.
2. *Total Assets*: sum of total current assets, long-term receivables, investments in non-consolidated subsidiaries, other investments, properties, plants and equipment, other assets.
3. *Total Debt*: sum of short-term and long-term financial debt.
4. *Dividend Yield*: expression of the dividend per share as a percentage of the share price.

It has been computed the natural logarithm of the variable Total Assets and the variable thus obtained is defined as Size. Tobin's Q enters regression in natural logarithm. The leverage was calculated as the ratio between the Total Debt and the Total Assets.

[5] Refinitiv, website: www.refinitiv.com
[6] Treccani Encyclopedia, website, www.treccani.it

The main independent variables in the model are the lagged ESG score and its squared term. The variable $ESGscore_{it-1}$ represents the Environmental, Social, and Governance (ESG) rating of firm *i* in period *t−1*, serving as a proxy for the firm's sustainability performance. Its inclusion in the model aims to capture the direct linear effect of ESG performance on firm valuation, as measured by Tobin's Q.

The squared term, $ESGscore\_SQ_{it-1}$, accounts for potential nonlinearities in the relationship between ESG performance and firm value. Specifically, it allows for the possibility that the marginal impact of ESG performance varies depending on its level — for instance, diminishing returns or a U-shaped relationship.

Together, these two variables enable the analysis of whether the relationship between ESG performance and market valuation is quadratic, offering a more nuanced understanding of how sustainability initiatives influence firm value.

In Table 4, the main descriptive statistics are shown, while the correlation matrix is in Table *5*. The most correlated variables are leverage and size (0.4073).

The descriptive statistics are based on variables winsorized at the 1st and 99th percentiles to mitigate the impact of extreme values and improve robustness.

Table 3: Descriptive Statistics

Variable	Average	Median	Standard Dev.	Min	Max
(ln)Tobin's Q	0,305	0,251	0,595	-0,956	2,239
(ln)TotalAsset	15,035	14,968	1,438	10,507	18,393
Leverage	0,258	0,259	0,154	0,000	0,645
(%) Dividend Yield	2,116	1,840	1,642	0,000	8,777

Source: elaboration by the authors

To assess the presence of multicollinearity among the explanatory variables, we computed Variance Inflation Factors (VIFs). All VIF values were close to 1 (ranging from 1.04 to 1.25), which is well below the commonly used threshold of 10[7]. These results indicate that multicollinearity is not a concern in our specification model.

Table 4: Correlation Matrix

	Tobin's Q	Size	Dividend Yield	Leverage	ESG Score
Tobin's Q	1				

[7] The VIFs for the variables included in the model are as follows: Leverage = 1.248, Dividend Yield = 1.043, and Size = 1.214. These values suggest a low level of collinearity.

Size	-0,1666	1			
Dividend Yield	-0,1001	0,0317	1		
Leverage	-0,1963	0,4164	0,0634	1	
ESG Score	0,0100	0,1124	-0,0052	0,0529	1

Source: elaboration by the authors

For the analysis, a fixed effects model was initially employed in order to account for unobserved heterogeneity across firms. Subsequently, a Probit model was implemented, in which the dependent variable is a dichotomous version of Tobin's Q, defined as equal to 1 when Tobin's Q is greater than 1, and 0 otherwise. Year dummy variables were included in both specifications, and the independent variables were lagged by one year. Robust standard errors were used to correct for potential heteroskedasticity.

3 Results

Our outcomes are based on three separate regression analyses, each using a different ESG score from three reputable data providers: Refinitiv, Bloomberg, and Truvalue Labs. The goal is to assess whether the results converge empirically when using sustainability scores from different rating agencies. The dependent variable, Tobin's Q, and the independent control variables (size, leverage and dividend yield) remain constant across all analyses.

3.1 Results from Refinitiv ESG Data

Refinitiv provides one of the most extensive ESG databases in the industry, covering 85% of the global market capitalization and offering data across over 630 different ESG metrics, with historical data dating back to 2002. Refinitiv's ESG scores are specifically designed to transparently and objectively assess a company's commitment to and effectiveness in ESG performance, using company-reported data[8].

Table 7 reports the results of four OLS regressions where the dependent variable is the natural logarithm of Tobin's Q, used as a proxy for firm market valuation. The analysis is conducted by including the overall ESG score and its three sub-components (Environmental, Social, and Governance) as key explanatory variables, along with standard control variables such as firm size, leverage, and dividend yield. Year fixed effects and robust standard errors are applied in all models.

The results reveal that the overall ESG score does not have a statistically significant impact on Tobin's Q, either in its linear or quadratic form. This evidence suggests that, at an aggregate level, ESG performance may not be a decisive factor in explaining variations in firm market value. However, when disaggregating the ESG dimensions, some heterogeneity emerges.

[8] Refinitiv, May 2022, *Environmental, Social and Governance Scores from Refinitiv*, web site: www.refinitiv.com

In particular, the Environmental (E) score shows a negative and weakly significant linear effect on firm valuation ($\beta = -0.00384$, $p < 0.10$), while its squared term remains insignificant. This may indicate that environmental initiatives, although socially desirable, might be perceived by investors as a cost in the short term, especially if not accompanied by immediate financial returns. The Social (S) and Governance (G) scores, as well as their squared terms, do not exhibit statistically significant effects, suggesting that their influence on market value is either limited or not captured through a simple quadratic specification.

The control variables are consistent across all model specifications and behave as expected. Firm size has a negative and highly significant effect on Tobin's Q, possibly reflecting the market's lower growth expectations for larger, more mature firms. Leverage is also negatively associated with firm value, aligning with the notion that a high debt levels increase financial risk. Lastly, the dividend yield exhibits a strong negative impact, potentially indicating that firms with higher payouts are perceived as having fewer reinvestment opportunities.

Overall, while the models demonstrate a strong explanatory power (adjusted $R^2 = 0.81$ in all specifications), the lack of consistent significance in ESG-related coefficients suggests that the relationship between sustainability performance and market valuation is complex, possibly nonlinear in not fully captured ways by quadratic terms and may depend on additional contextual or sector-specific factors.

Table 5: OLS model, dependent variable ln(Tobin's Q)

Variables	**Coefficients**			
	ESG Score	**E Score**	**S Score**	**G Score**
Constant	3,97116*** (0,860484)	4,04917*** (0,827323)	3,90982*** (0,865863)	3,82198*** (0,857021)
Score	−0,00376 (0,00408194)	**−0,00384128* (0,00228041)**	−0,00161057 (0,00299841)	0,00292005 (0,00250164)
ScoreSQ	2,28480e-05 (3,87478e-05)	2,57163e-05 (2,17511e-05)	9,08963e-06 (3,03733e-05)	−3,10807e-05 (2,26398e-05)
Size	**−0,221393*** (0,0560364)**	**−0,227373*** (0,0539249)**	**−0,222448*** (0,0564186)**	**−0,224075*** (0,0558516)**
Leverage	**−0,350509** (0,156114)**	**−0,342546** (0,154926)**	**−0,350948** 0,156006**	**−0,353604** 0,153100**
Dividend Yield	**−0,0347115*** (0,0117877)**	**−0,0346784*** (0,0116986)**	**−0,0348785*** (0,0118093)**	**−0,0349356*** (0,0115671)**
Years dummy	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes
R^2 **Adjusted**	0,81	0,81	0,81	0,81

Number of observations	1736	1736	1736	1736

Source: elaboration by the authors

Table 7 shows the result of the OLS model. All control variables are 1-year lagged and they are: natural logarithm of total assets, leverage and dividend yield. Moreover, year dummy variables have been added. Also, the ESG Score is 1-year lagged. Robust standard errors have been adjusted for heteroscedasticity and autocorrelation (HAC) and are in parenthesis.
***, **, * denote statistical significance at the 1%, 5% and 10% respectively.

3.2 Results from Bloomberg ESG Data

Bloomberg[9] is a leader in the data provider and analytics market, with its terminal widely used by universities, banks, and other financial market participants. One of its key services is providing ESG data and scores, aiming to deliver transparent, flexible, and comparable information. Bloomberg covers 88% of global market capitalization, evaluating approximately 15,000 companies across more than 100 countries based on over 5,000 sustainability criteria, with historical data encompassing 16 years[10].

Table 8 presents the results of four OLS regressions using Bloomberg ESG scores and their sub-components (Environmental, Social, and Governance) as explanatory variables.

The findings show that the overall Bloomberg ESG score has a significant nonlinear relationship with firm market valuation. The linear coefficient is negative and statistically significant at the 5% level ($\beta = -0.0133$), while the squared term is positive and significant ($\beta = 0.000144$, $p < 0.05$). This combination suggests a U-shaped relationship, where the ESG score initially reduces firm value but becomes beneficial beyond a certain threshold. This implies that only higher levels of ESG performance are associated with a positive market premium, potentially reflecting investor expectations about long-term sustainability benefits.

The Environmental (E) score also exhibits a weakly significant nonlinear effect. The linear term is negative ($\beta = -0.0042$, $p < 0.10$) and the squared term is positive and marginally significant ($\beta = 5.08\text{e-}05$, $p < 0.10$), again indicating a possible U-shaped pattern, though less pronounced than the one observed for the total ESG score. These results may reflect the idea that initial investments in environmental practices are costly and not immediately valued by the market, but that firms with higher environmental standards eventually gain reputational or operational advantages.

Table 6: OLS model, dependent variable ln(Tobin's Q)

Variables	**Coefficients**			
	ESG Score	**E Score**	**S Score**	**G Score**

[9] www.bloomberg.com
[10] Bloomberg Terminal ESG, 2023

Constant	4,71291*** (0,804272)	4,64682*** (0,809957)	4,60824*** (0,788556)	4,93978*** (0,885776)
Score	**−0,0133027**** **(0,00635302)**	**−0,00421885*** **(0,00243956)**	0,00285679 (0,00490765)	−0,0116980 (0,00767858)
ScoreSQ	**0,000144057**** **(7,11730e-05)**	**5,08304e-05*** **(3,02817e-05)**	−5,06124e-05 (8,76802e-05)	8,49367e-05 (5,58024e-05)
Size	**−0,259287***** **(0,0524234)**	**−0,268540***** **(0,0532782)**	**−0,273205***** **(0,0518458)**	**−0,268343***** **(0,0510591)**
Leverage	**−0,430449***** **(0,141864)**	**−0,400575***** **(0,142418)**	**−0,386163***** **(0,142328)**	**−0,411823***** **(0,144248)**
Dividend Yield	**−0,0286489***** **(0,0105165)**	**−0,0290440***** **(0,0105810)**	**−0,0281206***** **(0,0106237)**	**−0,0276988***** **(0,0104231)**
Years dummy	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes
R^2 Adjusted	0,81	0,81	0,81	0,80
Number of observations	1800	1794	1794	1800

Source: elaboration by the authors

Table 8 shows the result of the OLS model. Each column shows the regression output with Tobin's Q (in natural logarithm) as the dependent variable and ESG score and pillar score as the main independent variable (each for column). All control variables are 1-year lagged and they are: natural logarithm of total assets, ROA, dividend yield and leverage. Moreover, sector and country dummy variables have been added. Also, the ESG Score is 1-year lagged. Robust standard errors have been adjusted for heteroscedasticity and autocorrelation (HAC) and are in parenthesis.

***, **, * denote statistical significance at the 1%, 5% and 10% respectively.

Conversely, the Social (S) score and Governance (G) score do not exhibit statistically significant effects in either their linear or quadratic forms. This suggests that, based on Bloomberg data, market valuation is less responsive to social and governance initiatives when considered standing alone. This may be because these dimensions are less visible to investors or more difficult to translate into tangible financial outcomes in the short term.

3.3 Results from Truvalue Labs by FactSet ESG Data

Factset[11] is an American financial data and software company with more than 180,000 customers worldwide. In 2020, Factset acquired Truvalue Labs, a pioneer in the sustainability market as it was the first company to use Artificial Intelligence to ESG data with the aim of identifying opportunities and risks for end investors.

[11] www.factset.com

The data comes from more than 100,000 external sources, including local, national and international information, non-governmental organizations (*Business & Human Rights Resource Centre*, *International Rivers*, *Carbon Tracker Library*), trade publications, workers' associations (*Trade Union Congress*, *Global Unions*, *Public Services International*), government reports and academic reports which include both positive and negative events with the aim of providing a sustainability score that is as up-to-date as possible with respect to the occurred events. There are more than 230,000 companies, public and private, that are monitored with a series of data starting from 2007. The data is issued in more than 30 different languages[12]. Truvalue Labs uses *machine learning* to aggregate data from more than 100,000 sources, to extract and process 4.5 million data points per month deemed relevant to specific industries and companies, to analyze 300,000 indicators generated monthly, to generate four types of *scores* from 26 categories, and to provide more than 14 years of historical observations.

Table 9 shows the results of the OLS regression, using the sustainability score issued by Truvalue Labs as the main independent variable.

Table 7: OLS model, dependent variable ln(Tobin's Q)

Variables	**ESG Score**
Constant	3,96178*** (1,10979)
Score	−0,00295680 (0,0153303)
ScoreSQ	1,85873e-05 (0,000131624)
Size	**−0,222120*** (0,0674522)**
Leverage	**−0,491986*** (0,158841)**
Dividend Yield	**−0,0343877*** (0,0112545)**
Years dummy	Yes
Robust standard errors	Yes
R^2 Adjusted	0,81
Number of observations	1854

Source: elaboration by the authors

Table 9 shows the result of the OLS model. Each column shows the regression output with Tobin's Q (in natural logarithm) as the dependent variable and ESG Score as the main independent variable. All control variables are 1-year lagged and they are: natural logarithm of total assets, ROA, dividend yield and leverage. Moreover, sector and country dummy variables have been added. Also, the ESG Score is 1-year lagged. Robust standard errors have been adjusted for heteroscedasticity and autocorrelation (HAC) and are in parenthesis.

***, **, * denote statistical significance at the 1%, 5% and 10% respectively.

[12] Truvalue Labs, 2023, *ESG Data and Analytics from Truvalue Labs*

In contrast to the previous findings based on Refinitiv and Bloomberg scores, the results using the ESG score from Truvalue Labs show no statistically significant relationship with Tobin's, either in its linear or quadratic form. This evidence suggests that, at least in this specification and with this data provider, ESG performance as captured by Truvalue Labs does not appear to influence market-based firm valuation.

One possible explanation lies in the unique characteristics of Truvalue Labs' scoring methodology, which is based on real-time, event-driven data from alternative sources. While this dynamic approach may capture short-term ESG signals more effectively, it might be less aligned with long-term market valuation metrics such as Tobin's Q, which often reflects structural or strategic firm characteristics.

The control variables— i.e. firm size, leverage, and dividend yield—remain statistically significant and directionally consistent with previous estimations, confirming the robustness of these determinants across different model specifications.

These results highlight the variability in outcomes depending on the ESG data provider and underscore the importance of carefully considering the underlying methodological differences when interpreting the relationship between ESG performance and firm value.

4 Sensitivity Analysis

Given the results obtained from the fixed effects OLS model, a sensitivity analysis was conducted to further test the robustness of the findings. Specifically, a probit model was employed, in which the dependent variable—Tobin's Q—was transformed into a binary indicator. This dummy variable takes the value 1 if Tobin's Q is greater than 1, showing that the firm is valued by the market above the replacement cost of its assets, and 0 otherwise. This transformation allows us to assess whether ESG performance has any statistically significant effect on the likelihood that a firm is positively valued by the market, rather than on the magnitude of that valuation.

Table 10 presents the results of the probit model estimated using ESG data from Refinitiv, where Tobin's Q is transformed into a binary variable equal to 1 when it exceeds 1. The analysis reveals a nonlinear relationship between ESG performance and the likelihood of a firm being positively valued by the market.

Specifically, the linear ESG score is negative and statistically significant at the 5% level (−0.015), while the squared term is positive and highly significant ($p < 0.01$). This suggests a U-shaped relationship, where firms with very low or very high ESG scores are more likely to be valued above 1 (Tobin's $Q > 1$), whereas firms with intermediate scores may be less likely to achieve this valuation threshold. Such a pattern implies that the market rewards either clear ESG leaders or accepts low ESG engagement when it is accompanied by strong financial fundamentals but may be sceptical toward firms with moderate ESG practices that do not clearly signal commitment or performance.

When disaggregating the ESG score into its E (Environmental), S (Social), and G (Governance) pillars, the results are more nuanced:

- The Environmental and Social scores both exhibit a similar U-shaped pattern, with positive and significant squared terms and weaker or insignificant linear terms. This again suggests that extreme positions—either low or high—on these dimensions may influence market perception.
- Conversely, the Governance score shows no statistically significant effect in either its linear or squared form, indicating that within this specification, corporate governance as measured by Refinitiv does not significantly affect the probability of being valued above Tobin's Q = 1.

These results confirm the importance of accounting for nonlinearity in the ESG–valuation relationship and highlight the heterogeneity across ESG dimensions, particularly in how investors interpret environmental and social performance compared to governance factors.

Table 8: Probit model, dependent variable Dummy Tobin's Q - Refinitiv

Variables	**Coefficients**			
	ESG Score	**E Score**	**S Score**	**G Score**
Constant	1,92813*** (0,460232)	1,59975*** (0,427340)	1,74818*** (0,444974)	0,255631 0,423017
Score	**−0,0150510** (0,00702895)**	0,00252993 (0,00429357)	−0,00710687 (0,00566188)	−0,000791890 (0,00658590)
ScoreSQ	**0,000333561*** (7,46826e-05)**	**0,000114822** (4,65123e-05)**	**0,000232610*** (5,78895e-05)**	−5,37677e-06 (6,39540e-05)
Size	−0,117906*** (0,0299336)	−0,112537*** (0,0296520)	−0,112916*** (0,0292568)	0,0148495 (0,0259404)
Leverage	−1,23400*** (0,235608)	−1,17335*** (0,232095)	−1,24934*** (0,237061)	−0,903425*** (0,231395)
Dividend Yield	0,0275029 (0,0219481)	0,0400606* (0,0219641)	0,0211352 (0,0221682)	0,0658347*** (0,0214389)
Years dummy	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes
Number of observations	1744	1744	1744	1744

Source: elaboration by the authors

Table 9 presents the results of the probit model using Bloomberg ESG data. The overall ESG score displays a U-shaped relationship with firm valuation: the negative linear and positive squared coefficients are both statistically significant. This suggests that firms with either very low or very high ESG scores are more likely to be valued above replacement cost, while those in the middle range may not benefit from a clear market premium.

When considering the individual pillars:

- The Environmental score shows only a weak nonlinear effect.
- The Social score has a positive and significant linear coefficient, indicating a direct and favorable association with firm valuation, without evidence of nonlinearity.
- The Governance score mirrors the overall ESG trend, with a U-shaped pattern driven by significant linear and squared terms.

These findings reinforce the importance of accounting for nonlinear ESG effects and reveal that market responses vary across the different ESG components.

Table 9: Probit model, dependent variable Dummy Tobin's Q – Bloomberg

Variables	**Coefficients**			
	ESG Score	**E Score**	**S Score**	**G Score**
Constant	2,48281*** (0,489554)	1,47510*** (0,413054)	1,12307** (0,404955)	3,94992*** 0,781391
Score	**−0,0419566** (0,0144148)**	−0,00250410 (0,00495783)	**0,0333624*** (0,00907006)**	**−0,0890863*** (0,0182021)**
ScoreSQ	**0,000868642*** (0,000173910)**	**0,000191222** (7,51964e-05)**	−0,000135633 (0,000166163)	**0,000753979*** (0,000133987)**
Size	−0,0150510*** (0,0289093)	−0,0877707*** (0,0287151)	−0,0955248*** (0,0274251)	−0,0798017*** 0,0264941
Leverage	−1,18792*** (0,235551)	−0,965477*** (0,232604)	−1,05049*** (0,233226)	−1,24364*** (0,237835)
Dividend Yield	0,0153693 (0,0208316)	0,0397904* (0,0204838)	0,00705350 (0,0212463)	0,0357825* (0,0206111)
Years dummy	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes
Number of observations	1800	1744	1744	1744

Source: elaboration by the authors

Table 12 reports the results obtained using ESG scores from Truvalue Labs. This provider adopts an AI-driven, event-based approach to ESG assessment, relying on real-time data from a broad range of external sources. The findings indicate a nonlinear relationship between ESG performance and the likelihood of a firm being valued above market replacement cost. Specifically, the linear ESG term is negative and marginally significant, while the squared term is positive and statistically significant at the 5% level, suggesting a U-shaped relationship. This implies that firms with either very low or very high ESG scores are more likely to be positively valued by the market, whereas those with moderate ESG performance may not experience the same effect.

These results underscore the importance of considering nonlinear effects when evaluating the impact of ESG performance on firm valuation, particularly when utilizing dynamic, event-driven ESG data such as that provided by Truvalue Lab.

Table 10: Probit model, dependent variable Dummy Tobin's Q – Facset Truvalue Labs

Variables	**Coefficients**
	ESG Score
Constant	2,01268* (1,12073)
Score	**−0,0717573*** **(0,0394439)**
ScoreSQ	**0,000777053**** **(0,000360918)**
Size	−0,0104182 (0,0238982)
Leverage	**−0,739347***** **(0,224336)**
Dividend Yield	**0,0468984*** **(0,0194057)**
Years dummy	Yes
Robust standard errors	Yes
Number of observations	1864

Source: elaboration by the authors

Based on the probit model analyses utilizing ESG scores from Refinitiv, Bloomberg, and Truvalue Labs, a consistent nonlinear (U-shaped) relationship emerges between ESG performance and the likelihood of a firm being valued above replacement cost (Tobin's Q > 1). This pattern suggests that firms with either very low or very high ESG scores are more likely to achieve higher market valuations, while those with moderate ESG performance may not experience the same effect.

However, the strength and significance of this relationship vary across the different ESG data providers. For instance, the U-shaped effect is more pronounced in the models using Bloomberg and Truvalue Labs scores, whereas the model based on Refinitiv data shows a less significant relationship. These discrepancies highlight the impact of differing ESG scoring methodologies and underscore the importance of considering the source of ESG data when evaluating its influence on firm valuation.

5 Conclusions

The aim of this paper is to investigate the presence of divergences in the sustainability rating assignment process, issued by different *data providers* and to explain these divergences in the light of the different

methodologies used. We try to understand whether there are significant divergences in the *sub-pillars* and weights assigned to each of these by the *providers* on the market, since these factors have been indicated, by the existing literature, as the main causes of the subjectivity of this market.

The analysis conducted using ESG data from Refinitiv, Bloomberg, and Truvalue Labs highlights how the relationship between ESG performance and firm market valuation is not only complex but also highly dependent on the data provider and methodological approach. The OLS results suggest that ESG scores, in their linear or quadratic form, do not have a consistent impact on Tobin's Q across all datasets, with only Bloomberg data showing a significant nonlinear relationship. However, the probit models—where firm value is interpreted as a binary outcome—reveal a more robust pattern: in all three datasets, a U-shaped relationship emerges, indicating that firms with either very low or very high ESG scores are more likely to be valued above replacement cost. This suggests that markets may reward clear ESG leaders, while being more skeptical of firms with moderate, less distinctive ESG profiles. Differences in results across providers also reflect the methodological divergence in how ESG performance is measured, emphasizing the need for caution when interpreting ESG data and comparing it across sources.

Through a detailed analysis of the assignment process implemented by each of the three data *providers*, it was possible to find both similarities and discrepancies that make it possible, in an approximate way, to formulate a general view of the current dynamics of the ESG market at a global level. About the analysis of the categories (or *issues*) considered by each of the *providers*, it is possible to observe the following:

- As far as the environmental pillar is concerned, categories coincide, except for "emissions" category, which is assessed by Bloomberg only when it comes to the ESG Disclosure Score. When reviewing issues underlying pillar E in the formulation of the Bloomberg ESG Score (BESG), the category "emissions" disappears and, from the description provided and reported in Table 22, is not even included in another issue. Given that issues vary from sector to sector in the case of Bloomberg, it means that the provider does not believe that emissions in the food and beverage sector are an issue to be evaluated for the purpose of scoring.

  Moreover, the "environmental sustainability of the product" category is not included in the environmental pillar by Truvalue Labs, but in the Social Capital Pillar.

  Finally, the only category which is common to all three providers is "use of resources" (water, energy and waste).
- As far as the **social** pillar is concerned, we can identify two common macro-categories which are, on the one hand, everything related to product quality and therefore consumer safety and health, marketing campaigns and labelling procedures and, on the other hand, everything related to occupational health and safety.
- As far as the **governance** pillar is concerned, it is only possible to proceed with a comparison between Bloomberg and Refinitiv, since the "leadership & governance" category disappears altogether for Truvalue Labs when moving from general to sector-specific categories.

The common issue between Refinitiv and Bloomberg is the shareholder issue. Bloomberg focuses more on everything related to the board (from the number, to gender, to compensation, to incentive plans) and on the auditing and control structures in a very detailed way, while Refinitiv, in addition to dealing with managerial issues, albeit in a less scrupulous way, also deals with how the CSR strategy is communicated both within the corporate structure and externally by the company's management.
It should be underlined that even among the general categories identified by the SASB, aspects related to the board, such as structure, incentives, remuneration, meetings, decision-making processes are not taken into consideration. The focus is more on issues such as the relationship between the company and regulatory structures, the management of internal and external risks and the conduct of the company in the market.

In conclusion, it is possible to affirm that there are no significant differences at the *sub-pillar* level between Bloomberg and Refinitiv: it is possible to identify common issues, that, even though are declined in a different way, deal with the same aspects. There is a greater divergence between these two *providers* and Truvalue Labs: the most important difference is the fact that Truvalue Labs does not divide the categories into the typical three pillars (Environmental, Social and Governance) but identifies different pillars that make comparisons more complex to do and understand. The most significant figure is the total lack of issues relating to the board and its structure, the control bodies and shareholders' rights and this lack is found both at sector level and at general level.

Regarding the weights assigned by each of the providers to the *sub-pillars* for the purpose of aggregating the *ESG Score*, it is possible to make a comparison only between Refinitiv and Bloomberg, whose data are recalled here. In the beverage sector, Refinitiv assigns a weight of 29% to pillar E, a weight of 45% to pillar S and a weight of 25% to pillar G; in the food sector (which are actually two: food and *drug retailing* (1) and food and *tobacco* (2)), pillar E accounts for 24%/29%, pillar S accounts for 47%/45% and pillar G for 30%/25%. Bloomberg provider assigns two scores: the *ESG Disclosure Score* has the characteristic of weighing each *pillar* equally 33%, while the priorities attributed to each *issue* in the assignment of the *Bloomberg ESG Score* are expressed on a scale from 1 to 5 and, therefore, which is a less intuitive method. This fact can be interpreted as a methodological divergence, since the comparison is not immediate. By making approximations concerning both the subsectors and the *issues* considered by the *providers* and if the provider demonstrates a greater or lesser sensitivity towards a specific issue when assigning weight/priority to the topic itself, several observations emerge:

- Regarding the environmental pillar, a key discrepancy is seen in the "product sustainability" category, which Bloomberg ranks as highly important (score of 1) across all sub-sectors (packaged food, alcoholic and non-alcoholic beverages), while Refinitiv assigns it the lowest weight among the three categories, prioritizing "emissions" and "use of resources." Refinitiv assigns the "product innovation" category a weight between 3% and 5%, while "emissions" weigh between 11% and 13%, and "use of resources" ranges from 8% to 13% across different sectors. Symmetrically, Refinitiv assigns a higher

priority to the category that measures how sustainable the company is in terms of resources used (energy, water and waste), while Bloomberg assigns a priority that fluctuates between 1 and 4 (from high to medium-low) depending on the sectors considered. In addition, Bloomberg does not consider the number of emissions released during the production process by a company to assess the "environmental sustainability" aspect, probably because it doesn't consider it significant in light of the specificity of the sector.

- As far as the **social** pillar is concerned, all providers assign a similar weight to the product quality category, considering also consumer health and safety: Refinitiv assigns a weight ranging between 13% and 15%, while Bloomberg assigns a priority ranging from 1 to 3 (from high to medium). Surprisingly, about the workforce and, therefore, occupational health and safety, Refinitiv assigns percentages like those seen for the previous category (from 12% to 15%), while Bloomberg assigns values of 2 and 3 for the beverage sector and a value of 5 (the lowest on the scale) for the food sector. Therefore, the issue of the workforce would seem to be treated with a diametrically opposed awareness.
- As far as the **governance** *pillar* is concerned, Bloomberg has the peculiarity of not making differences when assigning pillar weights to a wide range of different sectors and industries. A similar approach is also implemented by Refinitiv, but only about the *G Score*, while when the overall score is taken into account, weights tend to vary, albeit in rather small ranges. The management and board category is a top priority, both in Refinitiv and Bloomberg; the divergence becomes more relevant when it comes to the common "shareholders rights" category, where Bloomberg assigns a priority of 2 (medium-high), while Refinitiv assigns a rather low one of 5%-6%. The categories that do not coincide are *Audit* and *CSR Strategy*.

In conclusion, it is possible to affirm that there are some divergences, sometimes quite significant, in the weights assigned by each provider to the *subpillars*. It is also true that, from this point of view, a small divergence might be considered acceptable, since the weight might be the expression of the provider's culture, values, and branding and philosophical perspectives.

With regard to the methodological differences, in addition to the already mentioned Truvalue Labs subdivision in five *pillars* (*Environment, Human Capital, Social Capital, Leadership & Governance, Business Model & Innovation*) instead of the classic *Environmental*, *Social* and *Governance pillar*, Refinitiv defines 10 categories valid for all sectors and industries, while Bloomberg differentiates these according to the sectors considered in the evaluation, thus taking into account possible specificities. Categories and valuation metrics are some of the main causes of divergence, since they are the basis of the *scoring* process. Defining them unambiguously it would mean taking a first step towards greater standardization that would make the ESG market more convergent. In this regard, it is Truvalue Labs that uses a *sub-pillar* classification, which is not elaborated by the provider itself, but by the SASB (*Sustainability Accounting Standards Board*). This non-profit organization is part of the *IFRS* Foundation (*International Financial Reporting Standards Foundation*) and discloses the IAS/IFRS financial accounting standards, which are now applied ordinarily in the redaction of the financial

statements of listed companies (currently there are 168 [13] jurisdictions that apply these standards on a mandatory basis). Achieving the same level of standardization in the sustainability market would mean uniform, clear and transparent information, following an assessment that takes place according to the same criteria and therefore objectivity in the scoring methodology and greater credibility of the *score* itself. Moreover, a more standardized set of qualitative information may be properly used by machine learning devices. Another divergence is in the numerical scale, used to express the score: it can take values from 0 to 100 in the case of Refinitiv and from 0 to 10 in the case of Bloomberg. A further difference concerns the actual methodology: Refinitiv combines two types of scores, also considering controversies which may involve the dynamics of the company during the fiscal year. This aspect is not considered by Bloomberg, which releases only one type of score. Lastly, Factset even releases four different types of scores. These differences might be confusing for those who use this information, as they have different scores, and it is not always clear what each one is evaluating.

Moreover, there are at least two more observations that are worth mentioning: the first one is the confusion created by a non-uniform subdivision of the food and beverage sector into subsectors, that did not make the comparisons immediate in this paper. The second concerns the methodologies used to calculate and aggregate scores, which are different: Refinitiv uses the weighted average, Bloomberg uses a generalized average and Factset uses the moving average. There are different weighting factors such as the *Disclosure* Factor and the *Freshness Factor* that Refinitiv, for example, does not use. Moreover, there is clear evidence of the lack of full transparency with respect to how the sub-pillars are evaluated. The only rather complete and detailed information is that of the SASB, which also reports where to find useful indicators in the financial statements. The lack of information on this aspect for other *providers* increases the opacity with which the ESG market operates.

In conclusion, this paper has empirically highlighted several divergences in the ESG market across multiple dimensions (methodological, scoring, and awareness), as also pointed out by the existing literature. It has also examined the elements of standardization present in the market, revealing that these are rarely adopted or effectively utilized. At the end of our analysis, we align with scholars who argue that the sustainability market is still in its early stages, with promising potential for growth and improvement. The underlying foundations are widely supported, particularly considering recent climate events and increasing awareness of issues, such as inclusivity, health, and safety. However, these areas still exhibit significant uncertainty and subjectivity.

[13] IFRS Foundation, web site: www.ifrs.org

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