Do ESG ratings capture public accountability of companies?

by

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Author's declaration

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Abstract and policy summary

The ESG financial framework has appeared in response to the growing demand from consumers of financial products to provide them with more information about the sustainability and corporate responsibility of the companies. It is supposed to allow investors to make a more informed and conscious decision with their limited resources and no access to full information about all the processes of each company. It works well as a shortcut, however, there are certain areas where not all the possible social and environmental impacts have been taken into consideration, as it would overcomplicate the calculation of ESG ratings. As the system is growing and attracting more finances, it needs to be constantly improved and these issues need to be detected and fixed. In this paper, I'm focusing on the aspect of public accountability, or, in other words, I consider how company activities affect the employees, local communities, and global community, and see whether these effects are reflected well in a company's ESG rating. I use the fixed effects econometric model on companies included in three large global financial indices over the last 5 years, to account for individual characteristics and time trends. The results show that three selected metrics for public accountability, namely research and development contribution, number of people hired, and taxes paid, are not perfectly reflected in the current model of ESG. However, the absolute values of the negative effects are low and are not likely to affect money flow distributions between different companies. Proposed policy solutions include reconstructing ESG factors by including more details into the Social dimension, expanding the ESG indices to allow more companies to receive green financing, and promoting more transparency and disclosure through regulations on a governmental level.

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Chapter 1 – Introduction and Background

1.1 Socially responsible finance and ESG

People around the globe are becoming increasingly aware of environmental and social issues affecting every society on Earth. There is much more consensus than it was even ten years ago that active interventions into economic and financial systems are required to limit the harms to the environment and create more equal and just societies. In 2020, these topics became especially prominent: after the pandemic that has shaken the economics of most countries, a lot of people have claimed that rebuilding of an economy should happen in a "green" way, rather than simply restoring everything as it was before. Investors are increasingly concerned about where their money goes, and want to make a positive impact on the world in addition to receiving financial returns on investment (Serafeim et al. 2015). Such ideas were raised across frameworks such as Corporate Social Responsibility, Socially Responsible Investing, Stakeholder Capitalism, and, the most recent and popular, Environmental Social Governance (ESG). While the specifics may vary a lot, what these concepts have in common is the idea that corporations should care about the broader impact of their activities rather than focusing exclusively on returns to shareholders, and have to improve their environmental and social impacts as well.

In this paragraph, I will describe what ESG scoring is, what is its theoretical purpose, and what should be covered by ESG principles. ESG investing stands for Environmental, Social, and Governance investing, where each company can voluntarily receive a score reflecting its progress in these three areas (CFA Institute, 2020). At the moment, the most popular kinds of ESG assets accessible to investors are Exchange Traded Funds (or ETFs) and mutual funds that collect ESG-related equity and bonds into portfolios. The ESG is based on the idea that "nudging" the companies towards more responsible performance and more disclosure is more effective than exclusionary screening, which was the basis of the Socially Responsible Investing process. Broccardo et al. (2020) studied the relative effectiveness of exit strategies (divestment) compared to voice strategies (shareholder activism) and found voice to be more effective in pushing firms towards sustainable practices.

Since ESG is strongly affected by governmental policies and social attitudes, there are significant regional variations. Currently, Europe is driving the ESG growth with \$14 trillion total assets committed, followed by North America with \$12 trillion, while other regions are lagging significantly, the third-largest investor being Japan with \$2 trillion AUM (OECD 2020). European leadership is partially driven by actions of the European Union that have set climate and energy targets for 2030 and aim to be carbon-neutral by 2050. It has recently issued a common taxonomy to classify sustainable investments and made ESG disclosure mandatory for any company that has more than 500 employees (European Commission 2020). The US market is more bottom-up driven, and thus progresses slower, but has a significant role in ESG development due to the sheer size of the US financial market.

Multiple organizations and frameworks are working towards the same goal, including the most prominent Task Force on Climate-related Financial Disclosures, International Financial Reporting Standards Foundation, Sustainability Accounting Standards Board, the Carbon Disclosure Project, the Climate Disclosure Standards Board, the Global Reporting Initiative, and the International Integrated Reporting Council, and the EU Green taxonomy – Sustainable Finance Disclosure Regulation. This, on one hand, reflects the growing interest and development of the framework, and, on the other hand, a lack of clarity for investors and a lack of consistency between the providers. OECD (2020) and Kotsantonis & Serafeim (2019) have shown in their studies that the correlation between the ratings assigned by different organizations is low and this may limit both the actual contribution of the framework and external validity of any research on the topic of ESG done on a single set of data.

1.2 The impacts of ESG

ESG has experienced very fast growth over recent years both through green equity and various kinds of sustainable bonds. A prominent example is that the S&P Global Clean Energy index, which serves as a basis for many sustainable ETFs, has almost doubled in value in 2020, and has a valuation 41 times higher than the expected profits of 30 companies that are included in the index. This can be compared with blue-chip US stocks which increased only 16% and have 23 times their earnings in valuation. Morgan Stanley shows that an average P/E ratio of a green company increased by 24 points over the year, compared to 2 points for industry peers. Equity funds, including ETFs, gathered \$230 bn over 2020 (Nauman 2021). The finances invested in ESG funds increased dramatically from around \$300 billion in 2011 to around \$900 billion in 2019. In the first quarter of 2020, global sustainable open-ended funds attracted an additional \$40 billion, which shows a year-on-year increase of 41% (Foley 2020, BlackRock 2020). These are very substantial inflows that are sufficient for companies with high ESG ratings to make significant investments and to be motivating for the other companies to disclose and improve their ESG metrics.

There's some evidence that firms with good performance in ESG issues material to their industry tend to outperform their peers. Even if they focus on immaterial issues, there's no evidence that it may cause underperformance (Khan et al. 2016). Morningstar (2020) in the analysis of 745 European sustainable funds demonstrated that the majority have outperformed the traditional funds in the long term. In addition, this study found that the survival rate of sustainable funds over 10 years was higher than non-ESG funds (77% compared to 46% on average) (Riding 2020). The majority of ESG funds also have outperformed the market during the volatile times of the pandemics (World Resources Institute, 2020). Morgan Stanley's report (2019) has shown that there is no significant difference in returns between sustainable and comparable traditional funds, but sustainable funds may offer lower risk.

Chapter 2 – Literature Review

In this section, I'll make an overview of current research on factors contributing to high ESG ratings, and discuss some social aspects that are missing from the current vision of ESG.

Since ESG disclosure inevitably leads to additional costs for companies, both financial and reputational, not every company automatically initiates the disclosure in absence of legal regulations. Therefore, there's a question if only companies with certain characteristics or motivations may choose to get involved, causing selection biases. The undesirable consequence is that some firms potentially may receive green premiums without substantially altering their processes and environmental-social impacts (Porter et al. 2019). Moreover, many of the "positive" investments may have negative consequences in the longer term that are currently overlooked. These issues range from the conscious use of AI (Susman 2021) to the carbon footprint of batteries used in electric cars (Edelsten 2021).

There's a range of studies focusing on correlations between ESG ratings and different characteristics. Many of them focus on the relationship between ESG rating and company performance since this was initially the most controversial issue due to shareholder primacy. These papers include works like those by Sahut and Pasquini-Descomps (2015), Benabou and Tirole (2010), Fatemi et al. (2015), Albuquerque et al. (2019), and Giese et al. (2021), and most find either positive or no significant relationship between the score and the returns. Khan et al. (2015) have shown that good performance in material sustainability metrics causes significant outperformance and that ESG improvements are usually not value-destroying, whether they are material or not. Fatemi et al. (2017) described the effects of disclosure and ESG rating on company value and found that disclosure has an attenuating effect on both strength and weaknesses of a firm's performance concerning sustainability issues. Serafeim (2018) studied the relationship between public sentiment, ESG rating, and company valuation to find that the

green premium for high-performing companies has increased over the years and the premium is increasing as a function of positive public sentiment.

Another related layer of research examined the connection between firm risk and cost of capital in relation to its ESG score and found that a higher ESG score is often associated with lower risk and cost of capital. Examples include papers by El Ghoul et al. (2016) and Albuquerque et al. (2019) which considered the systematic risk, Seltzer et al. (2020) that described credit risk, El Ghoul (2011), and Ng and Rezaee (2015) discussing equity cost of capital, and Chava (2014) and Zerbib (2019) talking about debt cost of capital.

A lot of studies show that geographic location has a large impact on a company's ESG performance (Cai et al. 2016, Liang and Renneboog 2017), explained by country economic development, competition laws, political rights, and culture. They demonstrate that country is a stronger predictor than an individual firm's performance but has less impact on multinationals. For the US, similar studies exist which show the impact of the political affiliation of the state (Di Giuli and Kostovetsky 2014).

Some other studies use ESG as a dependent variable and show the effects of firm leadership characteristics (Iliev and Roth 2020, Borghesi et al. 2014, Di Giuli and Kostovetsky 2014) and ownership characteristics (Borghesi et al. 2014, Chava 2014, Dyck et al. 2019).

Borghesi et al. (2014) compared industries and discovered that average scores of some industries are lower than for others, establishing it as a common practice to use industry-demeaned scores for research. The extended summary of the literature on ESG and CSR can be found in the work of Gillan et al. (2021).

The abovementioned studies show that a lot of factors that are not directly included in the ESG system still have an impact on the ESG score of a company. This fact leads to concerns that some important factors are overlooked and may lead to undesired consequences. There is a lot of recent media attention towards such factors in the "S" category, which are not explicitly

defined, contrary to more detailed "E" factors. According to FTSE Russell, about 60-70 percent of large and midsized companies in developed markets provide data on the most disclosed environmental items, but there is only 5-15 percent disclosure on other issues (Thomas 2021). This may exacerbate the social issues associated with automation, inequality, and monopolistic concentration. (Johnson 2021). There are two original studies by Deluard, that provoked a lot of discussions by looking at tax rates and the number of employees of companies included in popular ESG ETFs. The first report of Deluard (2020) has shown that companies included in ESG ETF have on average much fewer employees per their market capitalization, and rely mostly on intangible assets to create their returns. In the second report, he addresses the fact that the top-15 highest ESG companies have much lower effective tax rates than average for Russell 3000 index. Figures 1 and 2 show the average deviation of characteristics of companies.



Figure 1: How the major ESG ETFs deviate from the Russell 3000 Index. (Deluard 2020)



Figure 2: How the ESG portfolio deviates from the Russell 3000 Index. (Deluard 2021)

My research will depart from this point to deeper reflect on the "S" factor in ESG, specifically taxes, employees, and innovation, and discuss how well they are reflected in the total rating.

Chapter 3 – Theory and Methodology

3.1 Theory and hypothesis

As mentioned in the literature review part, it is impossible for the ESG framework to explicitly take into account all the metrics related to its idea, potentially leading to undesirable impacts in some areas. In this research, I'll aim to compare whether the ESG system is aligned with corporate social responsibility and stakeholder capitalism frameworks in terms of public accountability.

The corporate social responsibility framework is concerned with treating the stakeholders of each company in a responsible manner (Hopkins 2005). Similarly, the idea of stakeholder capitalism has the purpose of maximizing utility for all stakeholders. The main idea of stakeholder capitalism is to get rid of shareholder primacy and consider the wider set of corporate responsibilities, towards the local communities, employees, suppliers, and consumers. Among all the stakeholders, local communities seem to be the least protected and regulated under current legal rules and ESG considerations: shareholders still hold the primacy, suppliers can follow the ESG framework by themselves, consumers are legally protected through product quality assessment and laws, and there are a lot of employee-related aspects explicitly included in ESG. In this study, I will focus on corporate public responsibility towards local communities (which for large companies are, in fact, global communities), and look into job creation, contribution to innovation, and taxpayer responsibility.

My study is going to be different from the reports of Deluard, as original reports use the direct comparison of averages between very small indices (15-30 companies) and the large Russell 3000 index. I will look for correlations between ESG ratings and public responsibility metrics inside two large global indices in addition to US Russell 3000, thus, expanding the variation inside datasets and increasing the number of high-ESG companies that are being considered.

In accordance with media reports, the preliminary expectation is that I'll find that at the moment paying fewer taxes and hiring fewer employees makes it easier for the companies to reach higher ESG ratings. However, they would require high indicators of intangible assets (and, consequently, R&D investment) to achieve it.

3.2 Methodology and econometric model

The research question will be answered by uncovering a causal econometric relationship between the ESG ratings (as a dependent variable) and accounting proxies for three measures of social accountability: taxpayer responsibility, number of employees, and innovation (as independent variables). Control variables will include measures of firm size and profitability, as well as other factors that were previously found to affect ESG rating.

The regression analysis is conducted in the form of panel data analysis. Data on firm ESG performance is a short time series with a large number of cross-sectional items since ESG rating is a relatively new phenomenon. The econometric model would firstly have an individual company as a cross-sectional item with time fixed effects, and secondly two-way fixed effects with industry and time fixed effects. Since I am more interested in the long-run effects of company characteristics on ESG score rather than how these effects may change over time, I prefer the fixed effects model over the first differences.

The fixed-effects model is appropriate for the analysis as many firms in the data are observed only a few times, and thus time series properties are less prominent than crosssectional differences. Omitted variable bias is mitigated by conditioning on all variables that don't change through time. Effects of the serial correlation for 5 years are also accounted for by using clustered standard errors clustered on the level of the cross-sectional unit chosen for either of the regressions.

Omitted variable bias is supposed to be dealt with by fixed effects, but there is still a probability that regression will overestimate the coefficients. Reverse causality is unlikely

because currently, no regulation would cause ESG rating affecting taxes or number of employees. Self-selection is unlikely because the indices used in this research are global indices built for other purposes, and ESG ratings were just artificially applied by me on top.

It may be the case that among smaller companies ESG ratings behave completely differently, however, it is not a primary concern since most ETFs that provide money inflows would still integrate only companies from large indices. The time series would probably be too short in time to observe any lags or leads. In addition, FE regression stands well in face of gaps in data that are possible for real data (Békés, Kézdi 2021).

Functional form:

$$ESG_{it} - \overline{ESG}_i = \lambda_t - \overline{\lambda} + \beta_1 (TAX_t - \overline{TAX}) + \beta_2 (RD_t - \overline{RD}) + \beta_3 (EMPL_t - \overline{EMPL}) + (X_{it} - \overline{X}_i)\delta + (\varepsilon_{it} - \overline{\varepsilon}_i)$$

Where TAX, RD, and EMPL are independent variables, and X_i are the controls.

Fixed effects on the individual level would take out the effects fixed for each company. This would allow to consider the case where we have a reason to think that industries have intrinsically different levels of observables such as taxes and we don't want to lose a variation between industries. Industry-level fixed effects would take care of time-invariant effects within each industry. The industry may have potentially large effects on ratings due to the sector-neutrality principle and because some industries may have intrinsically different levels of ESG due to their polluting potential, for example. This model would be useful for comparing companies within each industry.

Chapter 4 – Data and Descriptive Statistics

4.1 Dataset description

This research focuses on data and ESG ratings provided by the Thomson Reuters Refinitiv platform. Data was generated partly through mandatory company disclosure, partially through voluntary disclosure, and partly by calculations by Reuters. It is broadly similar to other ESG data providers, however, the potential major differences inherent to the current state of development of the ESG framework cannot be completely ruled out.

The selection of the universe of the companies was based on major global and local indices for the developed world, including Russell 3000, MSCI World, and S&P Global 1200. The choice of the indices is justified by the fact that ESG is mostly adopted in Europe and North America, and mostly by large companies with high market capitalization, so these indices are likely to provide material information. Each index constitutes a separate dataset for this study.

Data for five years back for most of the indicators was extracted, therefore, data for years 2016-2020 is included in each of the datasets.

Independent variables are intended to measure the community contribution of the corporation, with the following proxies: yearly R&D spending scaled by sales for innovation, taxation rates, and the number of full-time employees scaled by market capitalization for job creation. Controls eliminate the effects of firm size and financial performance. They were selected based on literature review and similar to those utilized by reputable researchers in the field. Those are profitability (ROA and ROA growth), size (logarithm of market capitalization), leverage (debt to equity ratio), and price-to-book ratio (Serafeim 2018, Khan 2016, Fatemi 2018). On top of that, since there are regional variations in legislation, region is also included as an independent variable for two global indices.

4.2 Descriptive statistics

Descriptive statistics for selected independent variables is shown on the example of MSCI World index (since indices produce similar trends). Full statistics can be found in the Appendix.







Figure 4: Full-Time Employees by ESG Grade



Figure 5: WACC Tax Rate by ESG Grade



Figure 6: Sales by ESG Grade

Figure 7: Market Cap by ESG Grade

The clearly visible trend in data is that companies with higher ESG Grade spend more on Research and Development and have more employees in absolute terms, especially the companies with an A+ rating. However, they also seem to pay the lowest amount of taxes in percentage form. Overall, companies in the highest ESG brackets are characterized by larger size and higher absolute revenues. These statistics demonstrate where the media concerns are coming from, however, more detailed data analysis is required to see if there is any causal relationship.

Chapter 5 - Results and Discussion

5.1 Econometric results

	MSCI World		Russell 3000		S&P Global 1200	
	Individual	Sector	Individual	Sector	Individual	Sector
VARIABLES	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore
TaxRate	-22.196**	-5.043	-44.837**	-12.319	-22.045**	-9.887
	(5.320)	(7.715)	(4.164)	(6.252)	(5.926)	(9.530)
EmployeesPMC	555,571	933,595*	335,344**	683,544**	541,262	143,29
	-410,739	-333,727	-66,977	-53,45	-489,789	-287,33
RDExpensePS	-0.165	-0.433	0.002	0.002	-0.817	-5.668**
	(0.130)	(0.551)	(0.003)	(0.003)	(0.632)	(1.597)
lnMarketCap	5.707**	8.203**	2.868**	7.374**	5.946**	6.471**
	(0.717)	(0.546)	(0.429)	(0.807)	(0.826)	(0.491)
ROA	-10.581*	4.885	-4.418**	5.003**	-9.263	-14.267**
	(5.205)	(5.705)	(1.665)	(1.546)	(6.071)	(4.296)
ROAChange	-0.278	-15.401**	1.973*	-3.804*	-1.809	-9.956
	(3.539)	(4.146)	(0.900)	(1.372)	(4.145)	(6.394)
Leverage	0.013	0.049*	0.004	0.050**	0.020*	0.060**
	(0.008)	(0.023)	(0.007)	(0.014)	(0.009)	(0.008)
PTB	-0.015*	-0.025	-0.009	-0.027	-0.014*	-0.010
	(0.006)	(0.028)	(0.006)	(0.023)	(0.006)	(0.021)
region		5.411**				5.701**
		(1.214)				(1.194)
Sector dummies	No	Yes	No	Yes	No	Yes
Year dummies	No	Yes	No	Yes	No	Yes
Constant	-69.426**	-152.455**	-12.921	-134.350**	-71.915**	-111.329**
	(17.551)	(14.871)	(9.802)	(18.835)	(20.477)	(12.740)
Observations	2,314	2,314	3,217	3,216	1,809	1,809
R-squared	0.158	0.423	0.161	0.465	0.145	0.346
Number of id	566		945		424	

Table 1: Econometric results for all companies

	MSC	World	ld Russell 3000		S&P Global 1200	
	Individual	Sector	Individual	Sector	Individual	Sector
VARIABLES	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore
TaxRate	-23.236**	-14.060*	-33.765**	-12.631**	-28.369**	-11.936
	(5.898)	(6.178)	(6.169)	(1.519)	(6.608)	(8.700)
EmployeesPMC	543,953	4,234	537,604	764,013**	519,732	-635,316**
	-664,41	-256,648	-287,463	-81,643	-743,8	-161,316
RDExpensePS	-1.868	-23.123**	-3.920	-19.211**	-4.446	-10.650**
	(8.830)	(5.411)	(8.704)	(3.257)	(15.144)	(1.942)
lnMarketCap	6.371**	8.525**	5.662**	9.239**	6.627**	6.793**
	(1.002)	(0.330)	(1.000)	(0.714)	(1.034)	(0.384)
ROA	-3.235	-24.230**	-16.580*	-26.066**	-4.241	-30.842**
	(6.706)	(8.013)	(7.202)	(6.711)	(7.940)	(5.550)
ROAChange	-6.401	2.756	2.787	-1.437	-3.421	5.751
	(4.577)	(4.103)	(4.966)	(4.487)	(5.704)	(4.921)
Leverage	0.043	0.855**	0.064*	0.230**	-0.030	0.639
	(0.192)	(0.216)	(0.028)	(0.047)	(0.196)	(0.339)
PTB	-0.018	-0.046**	-0.041**	-0.071**	-0.015	-0.043**
	(0.013)	(0.013)	(0.013)	(0.008)	(0.013)	(0.008)
region		5.551**				6.067**
		(0.542)				(0.365)
Sector dummies	No	Yes	No	Yes	No	Yes
Year dummies	No	Yes	No	Yes	No	Yes
Constant	-83.886**	-157.380**	-72.607**	-168.583**	-86.509**	-107.930**
	(24.741)	(8.990)	(23.417)	(13.966)	(25.871)	(8.798)
Observations	1,622	1,622	1,399	1,399	1,322	1,322
R-squared	0.159	0.419	0.159	0.550	0.180	0.372
Number of id	388		338		307	

Table 2: Econometric results for profitable companies

5.2 Results interpretation

The individual fixed effects model focuses on fixed effects on the company level. The sector dummy approach is used to ignore the individual company differences and focus on sector fixed effects. Two data sets were considered: the first table shows the result for all companies, and the second table includes only profitable companies.

Focusing first on individual fixed effects, we can observe that for all three indices, the increased tax rate is associated with a lower ESG rating on a 95% significance level, where 1% difference in tax rates corresponds to 0.22-0.45 points difference in ESG rating. For US index Russell 3000 only, a higher number of employees per market cap is associated on a significant level with a higher ESG rating, contrary to what Deluard (2020) claims. There's no statistically significant association between R&D expense as a proportion of revenue and ESG ratings. The results are pretty similar between all companies and the subset of profitable companies.

Looking at the model with sector-demeaned values, we can see that the smallest index S&P Global 1200 shows that higher R&D can be correlated with lower ESG rating, while more employees can increase the rating for two larger indices (on statistically significant levels). Tax rates lose their significance in these models, hinting that these tax differences can be attributed to the difference between industries. In the subset of profitable companies, higher taxes and higher R&D spending imply lower ESG ratings. In the larger index, more employees indicate a higher ESG rating, and in the smaller index actually, fewer employees indicate a higher ESG rating.

When summarizing the results, it is important to remember that for this research causation is not as important as correlation. If the correlation is established, it already shows the direction of money flows that are created due to ESG ratings and thus has material effects in the real world. Overall, several conclusions can be indicated from the results. Lower taxation and lower contribution to innovation can indeed be associated with a higher ESG rating. However, in general, higher-rated companies tend to hire more employees, except for the smaller universe of data, indicating that this trend can be reversed among the largest companies on the market and confirming partially the concerns about workplace creation, but only for the small subset of companies.

Overall, these results confirm that some media concerns are valid, but do not prove any significant harm due to low absolute values of the coefficients. With such values, very large variations in independent variables only lead to the changes in ESG rating which do not exceed one ESG grade, thus making it unlikely to substantially redirect the money flows from green investing. Therefore, there is no drastic need to take immediate action at the moment.

Chapter 6 – Policy, Conclusions, and Limitations

6.1 Policy proposals

This research results indicate several areas, where future policy work can be done to improve the impacts of ESG money flows. The three major vectors of work include reconstruction of the ESG rating itself, promotion of the system as a whole, and improvement of control over the proper implementation of the system. Overall, these measures would allow ensuring that investors can make more informed and useful choices.

1. Reconstructing ESG factors

The primary goal of this set of measures should be to make the composition of factors more balanced, while currently "Environmental" factors tend to be more detailed. Since social impacts can be so varied, the understanding of the "Social" component should be extended to include more areas, such as community contribution, described in this research.

2. Expanding the ESG indices

Comparing Deluard's reports and the results of this study, it can be said that issues with public contribution could be concentrated in the small number of top-rated companies. This can be fixed by expanding the major sustainable indices, which serve as a base for sustainable ETFs, from 15-30 companies to more, in order to alleviate the differences and to expand the financing opportunities.

3. Promotion of ESG

It currently depends on the country and region, if the promotion of the ESG system is mandated by the government or voluntarily adopted by the companies. Governments-driven decisions are more likely to be successful, as corporate-driven decisions will inevitably be subject to vested interests and at least partially motivated by keeping profits from falling. Governments should not rely on corporations for the creation of a system that will be satisfactory for all parties involved, and instead should follow the EU lead on centralization of the efforts.

4. Transparency and control

Since the disclosure is optional, there's no regulation for it analogous to how financial disclosure is regulated. To ensure transparency and correctness of the information that is fed into ESG ratings, companies should be obliged to enter legally binding agreements instead of relying on self-monitoring.

6.2 Conclusion and limitations

This researched considered the topic of responsible finance, and, in particular, the Environmental Social Governance factors system. This system has been receiving substantial media attention and had quite a significant impact on money flows from investors interested in sustainability. Therefore, it's important to know which factors can affect the ratings, other than those which are directly included into the grading system. This research was aimed to pay more attention to the "Social" factor of ESG, which often gets less attention than the "Environmental" factor. It was based on media articles and underlying reports in its selection of the concerning factors, specifically, public accountability factors, including R&D, tax rates, and job creation. The results have shown that while ESG seems to have certain undesirable relationship between tax rates, research spending and ESG rating, the absolute values of these impacts are low enough to take action safely and slowly without the need for urgent policies. The main policy proposals include specifying ESG factors better, expanding the size and number of indices which serve as base for sustainable ETFs, and promoting more disclosure and transparency.

There are several aspects of limitations in this study related to data. The results of the replicated studies will strongly depend on the data source since there is no consistency yet in actual practice between data providers. If the Refinitiv dataset is replaced by other widely accepted data providers such as MSCI, the results may change. Thus, this study uncovers the

potential drawbacks of one system of evaluation, but cannot give any econometric evidence regarding other systems. The claim can be done only on the assumption that all the systems follow similar rules. Secondly, data that is disclosed voluntarily can be subject to manipulations by the companies and selective disclosure, and the regression results can be affected by that.

Appendices

Appendix 1: MSCI World Index descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
year	7,920	2018	1,414303	2016	2020
TaxRate	7,596	0,255567	0,087034	0	0,787237
MarketCap	7,728	3,12E+10	7,25E+10	6,25E+07	2,23E+12
ESGScore	7,509	57,31979	20,06564	2,049178	94,30712
ESGScoreCh~e	7,289	0,073604	0,301498	-0,87711	10,18653
RD	2,811	9,88E+08	2,59E+09	-1,85E+08	4,27E+10
Ads	1,605	4,90E+08	1,01E+09	0	1,03E+10
ROAChange	7,682	-0,00172	0,066209	-1,36851	1,68562
Employees	7,351	42604,15	92219,5	0	2300000
ROA	7,796	0,067574	0,098761	-1,34649	1,385304
Sales	7,459	1,77E+10	3,53E+10	-9,09E+09	5,59E+11
Leverage	7,476	1,31435	7,606912	0	422,1
SalesChange	7,416	0,159404	4,122254	-3,12585	351,0422
РТВ	7,714	3,033528	122,2802	-10036,9	2322,665
lnMarketCap	7,728	23,4856	1,033441	17,95113	28,43404
InSales	7,452	22,58873	1,486444	14,03556	27,04968
id	7,920	792,5	457,2902	1	1584
sector	7,915	10,45546	3,545492	1	18
region	7,915	1,946936	0,947025	1	4
country	7,915	21,2969	9,989901	1	31
ESGScoreGr~m	7,509	5,607671	2,578243	1	12
ESGGrade	7,509	5,622453	2,42552	1	12
RDExpensePS	2,811	0,130797	0,75835	-0,29868	34,73013
AdsPS	1,401	0,050933	0,080009	-0,00867	0,808241
EmployeesPS	6,933	3,03E-06	3,88E-06	-1,4E-05	0,000107
EmployeesPMC	7,245	2,00E-06	3,27E-06	0	5,44E-05





Appendix 2: S&P Global 1200 Index descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
year	6,115	2018	1,414329	2016	2020
TaxRate	5,947	0,254629	0,080514	0	0,680564
MarketCap	6,052	4,05E+10	8,45E+10	6,25E+07	2,23E+12
ESGScore	6,000	61,93614	17,98334	3,593506	94,30712
ESGScoreCh~e	5,914	0,060968	0,245692	-0,53204	10,18653
RD	2,155	1,34E+09	3,09E+09	-1,85E+08	4,27E+10
Ads	1,220	6,98E+08	1,42E+09	0	1,12E+10
POAChange	6.010	0.00353	0.056287	0.85053	1 151167
Employees	5 727	-0,00333 5/203 50	10/220.6	-0,85055	2300000
ROA	5,727 6,061	0.072354	0.08/00	1 13062	0.711871
Solos	5,666	0,072334	4 20E + 10	-1,13002	5 50E ± 11
Lavarage	5,000	2,34E+10	4,20E+10	-3,90E+09	3,39E+11
Leverage	3,832	1,558/50	8,051577	0	422,1
SalesChange	5,653	0,148439	4,686685	-1,48199	351,0422
PTB	6,025	2,09083	133,0494	-10036,9	968,846
lnMarketCap	6,052	23,79256	0,996112	17,95113	28,43404
InSales	5,662	23,01666	1,336145	14,03556	27,04968
:4	6 115	612	252 0784	1	1002
	0,115	012	2 207712	1	1223
sector	0,115	9,440090	0.07202	1	17
	0,115	1,910399	0,97295	1	4
Country	0,115	24,13/3/	11,0028	1	54 10
ESGScoreGr~m	6,000	5,059333	2,375027	1	12
ESGGrade	6,000	5,070667	2,178715	1	12
RDExpensePS	2,155	0,08298	0,239684	-0,01882	8,867728
AdsPS	997	0,040786	0,069934	0	0,808241
EmployeesPS	5,312	3,19E-06	5,02E-06	-1,07E-06	0,000111
EmployeesPMC	5,688	2,11E-06	3,45E-06	0	5,44E-05















Appendix 3: Russell's 3000 Index descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
year	14,395	2018	1,414263	2016	2020
TaxRate	12,800	0,268063	0,082482	0	0,69084
MarketCap	13,173	1,22E+10	5,48E+10	2893286	2,23E+12
ESGScore	11,113	38,04258	18,39662	0,391399	93,4009
ESGScoreCh~e	9,290	0,134125	1,118115	-0,97864	63,42044
RD	5,564	3,48E+08	1,72E+09	0	4,27E+10
Ads	2,918	1,58E+08	5,37E+08	2000	7,62E+09
ROAChange	13,286	0,046032	4,060451	-29,7495	464,4459
Employees	13,292	13852,52	59493,84	0	2300000
ROA	13,656	-0,06577	4,066327	-471,111	3,27686
Sales	12,611	5,75E+09	2,13E+10	-1,19E+09	5,59E+11
Leverage	12,240	2,622674	132,1967	0	14606,95
SalesChange	11,756	2,08939	122,9711	-2,55152	12739
PTB	13,155	46,40429	3319,598	-10036,9	358896
lnMarketCap	13,173	21,50809	1,721815	14,8779	28,43404
InSales	11,999	20,68202	2,166506	6,907755	27,04968
id	14,395	1440	831,1245	1	2879
sector	14,380	10,29972	3,444676	1	18
region	14,385	1,039625	0,272412	1	3
country	14,385	19,59437	2,371095	1	20
ESGScoreGr~m	11,113	7,964006	2,396369	1	12
ESGGrade	11,113	7,934131	2,224685	1	12
RDExpensePS	5,031	11,96892	219,4039	-0,29868	12991
AdsPS	1,992	0,053619	0,24959	2,21E-05	9,542957
EmployeesPS	11,428	1,33E-05	0,000266	-1,4E-05	0,022
EmployeesPMC	12,793	2,84E-06	9,94E-06	0	0,00043





	MSCI World		Russell 3000		S&P Global 1200	
	Indiv FE	Sector Dummy	Indiv FE	Sector Dummy	Indiv FE	Sector Dummy
VARIABLES	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore
TaxRate	-22.196**	-5.043	-44.837**	-12.319	-22.045**	-9.887
	(5.320)	(7.715)	(4.164)	(6.252)	(5.926)	(9.530)
EmployeesPMC	555,571	933,595*	335,344**	683,544**	541,262	143,29
	-410,739	-333,727	-66,977	-53,45	-489,789	-287,33
RDExpensePS	-0.165	-0.433	0.002	0.002	-0.817	-5.668**
	(0.130)	(0.551)	(0.003)	(0.003)	(0.632)	(1.597)
lnMarketCap	5.707**	8.203**	2.868**	7.374**	5.946**	6.471**
	(0.717)	(0.546)	(0.429)	(0.807)	(0.826)	(0.491)
ROA	-10.581*	4.885	-4.418**	5.003**	-9.263	-14.267**
	(5.205)	(5.705)	(1.665)	(1.546)	(6.071)	(4.296)
ROAChange	-0.278	-15.401**	1.973*	-3.804*	-1.809	-9.956
	(3.539)	(4.146)	(0.900)	(1.372)	(4.145)	(6.394)
Leverage	0.013	0.049*	0.004	0.050**	0.020*	0.060**
C	(0.008)	(0.023)	(0.007)	(0.014)	(0.009)	(0.008)
РТВ	-0.015*	-0.025	-0.009	-0.027	-0.014*	-0.010
	(0.006)	(0.028)	(0.006)	(0.023)	(0.006)	(0.021)
region		5.411**				5.701**
		(1.214)				(1.194)
2.sector		-13.124**		2.640*		-9.911**
		(1.060)		(0.948)		(1.822)
3.sector		-29.655**		18.269**		-24.032**
		(3.211)		(1.730)		(4.484)
4.sector		-16.587**		43.933**		-14.070**
		(3.110)		(0.930)		(4.488)
5.sector		1.037		-5.217**		15.872**
		(1.220)		(1.646)		(2.514)
6.sector		22.542**		10.694**		-5.471*
		(1.249)		(1.001)		(2.214)
7.sector		-9.117**		11.229**		9.709**
		(1.069)		(0.992)		(2.927)
8.sector		-2.058		9.836**		4.796**
		(1.830)		(0.952)		(1.622)
9.sector		-4.197**		4.071**		14.846**
		(0.746)		(1.040)		(2.058)
10.sector		9.362**		14.162**		16.121**
		(1.031)		(0.963)		(2.607)
11.sector		14.783**		14.832**		3.755

Appendix 4: Econometric results for all companies

		(1.406)		(1.444)		(2.300)
12.sector				22.939**		7.746**
				(1.046)		(1.376)
13.sector		0.737		12.254**		16.668**
		(0.766)		(0.902)		(2.749)
14.sector		15.714**		24.416**		-2.408
		(1.574)		(1.376)		(2.291)
15.sector		-3.376**		14.088**		14.091**
		(1.120)		(1.198)		(2.395)
16.sector		9.834**		13.643**		13.615**
		(1.982)		(1.066)		(2.225)
17.sector		14.706**		10.097**		16.772**
		(1.308)		(1.157)		(2.284)
18.sector		2.458		6.340**		
		(1.303)		(1.088)		
2017.year		-0.237		-0.026		0.059
		(0.316)		(0.403)		(0.364)
2018.year		1.094		0.821		1.928**
		(0.777)		(0.470)		(0.245)
2019.year		1.208		1.395*		1.649**
		(0.944)		(0.516)		(0.456)
2020.year		0.748		2.177*		1.802**
		(1.157)		(0.971)		(0.609)
o.region	-				-	
o.sector						
Constant	-69.426**	-152.455**	-12.921	-134.350**	-71.915**	-111.329**
	(17.551)	(14.871)	(9.802)	(18.835)	(20.477)	(12.740)
Observations	2,314	2,314	3,217	3,216	1,809	1,809
R-squared	0.158	0.423	0.161	0.465	0.145	0.346
Number of id	566		945		424	

	MSCI World Russell 3000		S&P Global 1200			
	Indiv FE Prof	Sector Dummy Prof	Indiv FE Prof	Sector Dummy Prof	Indiv FE Prof	Sector Dummy Prof
VARIABLES	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore	ESGScore
TaxRate	-23.236** (5.898)	-14.060* (6.178)	-33.765** (6.169)	-12.631** (1.519)	-28.369** (6.608)	-11.936 (8.700)
EmployeesPMC	543,953	4,234	537,604	764,013**	519,732	-635,316**
	-664,41	-256,648	-287,463	-81,643	-743,8	-161,316
RDExpensePS	-1.868	-23.123**	-3.920	-19.211**	-4.446	-10.650**
	(8.830)	(5.411)	(8.704)	(3.257)	(15.144)	(1.942)
lnMarketCap	6.371**	8.525**	5.662**	9.239**	6.627**	6.793**
ROA	(1.002) -3.235 (6.706)	(0.330) -24.230** (8.013)	(1.000) -16.580* (7.202)	(0.714) -26.066** (6.711)	(1.034) -4.241 (7.940)	(0.384) -30.842** (5.550)
ROAChange	-6.401	2.756	2.787	-1.437	-3.421	5.751
Leverage PTB	(4.577) 0.043 (0.192) -0.018	(4.103) 0.855** (0.216) -0.046**	(4.966) 0.064* (0.028) -0.041**	(4.487) 0.230** (0.047) -0.071**	(5.704) -0.030 (0.196) -0.015	(4.921) 0.639 (0.339) -0.043**
region	(0.013)	(0.013) 5.551** (0.542)	(0.013)	(0.008)	(0.013)	(0.008) 6.067** (0.365)
2.sector		2.658*				
3.sector		-17.503** (3.584)		12.269** (1.294)		-28.347** (3.025)
4.sector		-10.478** (1.273)				-22.366** (1.011)
5.sector		10.889** (0.725)				4.164** (0.656)
6.sector		24.457**		13.754** (0.111)		-3.497**
7.sector		3.854**		-6.711 (3.656)		4.452** (0.652)
8.sector		(0.001) 9.524** (1.781)		(3.050) 8.483** (1.974)		-2.898** (0.718)
9.sector		2.336*		1.263		7.060**
10.sector		(1.001) 14.295** (0.713)		(1.050) 11.063** (1.070)		(0.401) 4.572** (0.444)
11.sector		16.909**		5.422*		(0.111)

Appendix 5: Econometric results for profitable companies

		(0.436)		(1.911)		
12.sector						2.072**
						(0.558)
13.sector		9.514**		11.616**		-5.045**
		(1.018)		(1.426)		(0.994)
14.sector		3.883**				-11.711**
		(0.821)				(1.331)
15.sector		0.383		3.226		11.165**
		(1.173)		(1.962)		(0.983)
16.sector		16.405**				3.582**
		(2.275)				(0.884)
17.sector		15.500**		11.522**		12.230**
		(0.667)		(1.035)		(0.489)
18.sector		6.249**		-2.723**		
		(0.796)		(0.351)		
2017.year		-0.096		-0.122		-0.249
		(0.238)		(0.336)		(0.554)
2018.year		2.105**		1.254**		2.046**
		(0.480)		(0.241)		(0.403)
2019.year		1.543**		1.783**		1.444**
		(0.506)		(0.332)		(0.269)
2020.year		0.780		3.172**		1.194
		(0.379)		(0.324)		(0.634)
o.region	-				-	
o.sector						
Constant	-83.886**	-157.380**	-72.607**	-168.583**	-86.509**	-107.930**
	(24.741)	(8.990)	(23.417)	(13.966)	(25.871)	(8.798)
Observations	1,622	1,622	1,399	1,399	1,322	1,322
R-squared	0.159	0.419	0.159	0.550	0.180	0.372
Number of id	388		338		307	

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