LUISS

Master's degree in Corporate Finance

Course of Corporate Governance

The empirical effects of ESG disclosure regulation

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Introduction

The issue of sustainability has been rightfully put forward as one of the most pressing issues in the world. The Corporate Social Responsibility Directive, which entered into force in 2023, is a major piece of ESG disclosure regulation which essentially expands the

Non-Financial Reporting Directive of 2014 to a much broader target, requiring most companies to report on sustainability as opposed to the "large listed companies, banks and insurance companies ('public interest entities') with more than 500 employees"[1] of the NFRD.

This is part of the European Green Deal, which promises "a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use"[2] to combat climate change and environmental degradation.

While this is certainly bringing us in the right direction, over two thirds of European citizens think that the steps their governments are taking are not enough to combat climate change[3]. This might have to do with the fact that, when it comes to business regulation, some of the recent actions have focused on ESG disclosure rather than the banning of certain production methods, which might be perceived as "not strong enough" to be effective, also when we consider practices such as greenwashing, which might inhibit whatever positive effect is being achieved.

The purpose of this study therefore is twofold. The first is to understand whether ESG disclosure regulation has influenced the industries it already impacted, those industries being the banking and financial sector, in terms of ESG and financial performance and, importantly, how companies that were not sustainable up until the introduction of

[1] NFRD Implementation Appraisal Briefing
[2] 2019 Communication from the Commission, The European Green Deal
[3] 2023 Climate Change Survey, European Commission

mandatory requirements and were forced by the regulation to change their sustainability policies differ from the rest of the population.

The main point that I want to understand is whether the response from unsustainable companies, whose investors probably are not unaware of the nature of the business, is to start reporting on how unsustainable their practices are, allowing their ESG scores to fall indefinitely, or to take steps towards changing their business to a more sustainable one and how does this impact their financial performance.

While a link between financial and ESG performance has already been established, not much has been done when it comes to the link between ESG disclosure and performance and most importantly if and how "forced" firms differ from other affected, more sustainable, firms.

Once these links are established, we can use them to better understand what the possible effects of the new Corporate Social Responsibility Directive are as well as future ESG disclosure regulation.

In short, the study will be divided in two parts, each section will be divided into three sections detailing Data and Methodology, Results and Discussion, tackling the questions of "Does ESG disclosure regulation empirically result in higher ESG investment?" (section I) and the and "Does the increase/decrease in ESG score result in increased performance?" (section II).

Literature review

The link between ESG and performance has been researched widely and for a long time, with the academic consensus being that ESG investing is beneficial to performance, both market and accounting based (Friede at al.,2015).

On the issue of performance, one of the most relevant papers for the purpose of this study is D'Amato et al. (2022), which still found a link between ESG and financial (accounting) performance but found that the benefits of higher ESG performance start to impact the profitability of the company mostly after a certain threshold. As I use the same ESG score data, this threshold can and will be used to compare the findings of this study for further analysis and interpretation with those of the article.

On this point I want to highlight how the connection between ESG performance and financial performance, while a positive coincidence, should not be a determining factor in decision making processes about sustainability, which should be prioritized regardless of its effects on profitability or valuation.

As we will look at responses to the Non-Financial Reporting Directive, however, we are not exactly interested simply in the relationship between ESG and financial performance but how ESG disclosure regulation is linked to ESG performance and in turn how this ESG performance is linked to financial performance.

The most relevant article for the study on the link between ESG disclosure and ESG score is Aghamolla and An (2023), which theoretically studied the effect of disclosure on the investment choices of a manager. The article allows a hypothetical manager to choose between a ESG and financial performance through the choice of a High ESG-Low ROI project and, vice versa, a Low ESG-High ROI project under a voluntary, where the manager has complete discretion on the extent of both ESG and expected cash flow reporting, and mandatory, where the manager has complete discretion on the extent of

expected cash flow reporting only, regimes. The article concludes that, under the mandatory regime, the manager will be more likely to invest in the ESG project even when the shareholder base is mostly made up of purely "financial" investors which do not care about sustainability issues.

These results are particularly strong when coupled with the consensus that ESG investing is beneficial to both profitability and valuation.

Another important article on the link between ESG disclosure regulation and ESG score is Cicchiello et al. (2022), which found evidence of the impact of the NFRD implementation on the ESG performance of the treated firms by using a US firms control group over the same timeframe. This article, however, did not differentiate between high ESG, low ESG and forced firms but only used a "general" group.

While the findings are very useful to prove the connection between the introduction of the Non-Financial Reporting Directive and the changes in ESG scores that we will see, we it does not provide a basis for more detailed differences between the groups.

There are other benefits of ESG disclosure regulations that have been studied.

One such study is Krueger et al. (2023) which, for example, found that heightened levels of ESG disclosure improve stock liquidity.

Another study, Ioannou and Serafeim (2017), looks at how disclosure and assurance levels change after regulation and finds that, even when assurance is not mandatory, levels of both disclosure and assurance increase significantly for treated firms both in the case of high and low disclosure levels prior to the introduction of regulation. More importantly for my study, Ioannou and Serafeim (2017) also finds that the increase in ESG disclosure has a positive effect on firm value (Tobin's Q), but that this effect is larger for

firms that had a lower ESG disclosure score prior to the regulation meaning that ESG disclosure levels have diminishing returns. This is in contrast with what D'Amato et al. (2022) found with regards to EBIT profitability and ESG score levels, which became stronger once a certain high ESG score threshold was passed. While there is no obvious explanation as to why this difference exists, it is important to note that D'Amato et al. (2022) used companies from the EuroStoxx-600 index while Ioannou and Serafeim (2017) used Bloomberg data from companies in China, Denmark, Malaysia and South Africa.

As mentioned, one key point of this study will be how the firms that were forced to implement these changes differ from those who willingly complied with the principles however, although there are some articles dealing with the effects of mandatory ESG regulation (e.g. Krueger et al., 2023), very few deal with how the mandatory regime changes how firms behave (e.g. Aghamolla and An, 2023).
This means that there will be not established background during the parts of the study concerning the forced firm issue.

ESG and ESG disclosure

While sustainability and ESG principles are closely related, there are key differences which are important to consider before the start of the study.
A simple way to think about the two, is that sustainability is the destination while ESG is how we know we're going there. All businesses have an impact on the environment, society and the economy, and sustainability is about being aware of the impact one's

business has and be mindful of avoiding negative externalities while bolstering positive ones, according to the European Environment Agency: “Sustainability is about meeting the world’s needs of today and tomorrow by creating systems that allow us to live well and within the limits of our planet”[4]. Today’s view of sustainability has been shaped over time by several works on the matter, notable among which are Limits to Growth (Donella Meadows et al, 1972) and The Economics of the Coming Spaceship Earth (Kenneth E. Boulding, 1966), which were fundamental in changing our view of the planet to one of a “closed” (spaceship) system, where resources are finite.

On the other hand, ESG is a more recent concept that aims at evaluating the performance of businesses and entities in general along the axis of their Environmental, Societal and Governance impacts, with the European Commission defining ESG as “a framework or criteria to measure the sustainability and ethical impact of an investment or a company focusing on 3 fields: Environmental, Social and Corporate Governance”[5]. One of the main differences between ESG performance and other traditional performance indicators is that ESG performance is relevant to all company stakeholders, including customers, suppliers and employees, which have become increasingly invested in the sustainability of entities.

As sustainability and ESG issues have become more and more important for investors, many companies found ways to improve their ESG “appearance” through selective reporting and greenwashing. A 2023 McKinsey survey on the issue found that “about 85 percent of the chief investment officers we surveyed state that ESG is an important factor

[4] Sustainability, European Environment Agency 2024
[5] Corporate sustainability and responsibility, European Commission

in their investment decisions"[6], but that they struggle with ESG communication, with CIOs asking for clear ESG standards that can allow them to more effectively consider sustainability for their investment decisions. On this point, the European Union has been working on a series of directives aimed at providing a clear framework for ESG reporting, precisely to improve the sought-after ESG clarity.

Three of the major regulatory documents on this issue are the European Sustainability Reporting Standards (ESRS), the Corporate Sustainability Reporting Directive (CSRD) and the Non-Financial Reporting Directive (NFRD).

The NFRD was the first step, requiring large listed companies, banks and insurance to publish ESG reports "on the policies they implement in relation to social responsibility and treatment of employees; respect for human rights; anti-corruption and bribery; and diversity on company boards"[7], with the CSRD expanding and strengthening the disclosure requirements to all large and listed companies and the crucial addition of the ESRS for providing the framework that the reports must follow, as under the NFRD companies are not required to follow a standard or framework. However, while the CSRD and ESRS were adopted in 2023, the NFRD was adopted in 2014, with the first reports being required for the 2017 financial year, meaning we have a large enough amount of data to analyse how companies reacted to the policy, which is not the case for the later directive.

One issue with ESG disclosure regulation is the possibility that some companies and investors who simply do not care about sustainability will shamelessly continue their

[6] Investors want to hear from companies about the value of sustainability, McKinsey 2023
[7] Non-Financial Reporting Directive

unsustainable operations while fully reporting on the environmental and social damages that they generate.

According to Aghamolla and An (2023), however, this will not be the case. According to the article, managers will invest in ESG projects even when this is not preferred by the shareholders, or that "mandating ESG quality disclosure results in over-investment in the sustainable technology."[8]. The theoretical effects behind this finding are based on a reduction in the incentive of secretly picking a low ESG-high ROI project when the markets expect a high ESG-low ROI project, as "if the manager privately deviates from the clean to the non-renewable technology, she is often unable to benefit from inflated market beliefs along the ESG dimension following non-disclosure of ESG quality". Vice versa an increase in the incentive of secretly picking the high ESG-low ROI project when the market expects a low ESG-high ROI, as the manager can be easily punished for low ESG performance (and under report future expected cash flows).

Data and Methodology I

As the European Union does not provide a list of the companies that have to report under the NFRD, I used Refinitiv to download a large dataset containing ESG data for European

[8] Aghamolla and An (2023)

companies that belong to the financial sector according to the Global Industry Classification Standard (GICS) developed by MSCI and S&P Dow Jones.

Each row of the dataset contains a company name, ticker, industry and the related 14 years of ESG scores and ESG scope data, which is a percentage showing how much of the company's operations are reported on. While part of the dataset, ESG scope data is very sparse and there is a significant amount of missing data, meaning that it will not be useful for statistical purposes.

As highlighted several times in this report, ESG scores are do not follow generally accepted standards and different agencies assign different value to different criteria, meaning that different agencies might assign very different scores to the same companies. All the ESG score data will be taken from Refinitiv (as D'Amato et al., 2022) in this study, meaning that different companies might have belonged to different groups if a different standard were used. This is an intrinsic limitation of working with ESG scores before an industry-accepted, widely used standard is developed and cannot be avoided.

It is important to note that the dataset includes all financial sector companies listed on a stock exchange in the European continent, including exchanges which do not fall under the jurisdiction of the European Union. To ensure that the dataset only contains companies affected by the NFRD, meaning companies both the European Union and sufficiently large insurance companies or banks, I cross referenced the companies using two iShares indexes (iShares Europe 600 Banks and iShares Europe 600 Insurance), reducing the total amount of companies from 931 to 66.

While this harsh selection has the drawback of excluding some treated firms from the dataset, it has the positive effect of including no non-treated firms in the dataset.

It is important to note that my datasets include the United Kingdom as a European Union member state. I believe this will not alter the findings as the referendum happened in 2017, which is the first financial year where ESG reporting was mandatory under the NFRD, and left in 2020. This means that the country remained a member of the European Union for all but two years in my dataset.

In order to conduct the analyses, I will start each section by plotting graphs to look for patterns and then run a regression, where I will use the ESG score as the dependent variable and the year as the independent variable. This will allow me to see if there are significant changes in the ESG scores around 2017 or 2014, when the NFRD was adopted.

To better suit the different needs of the different analyses, I transformed the data in different ways for each section. The plots will be made on a modified dataset that only contains ESG scores, with years and companies as respectively row and column headers, while for the regression I stacked the original dataset to obtain one where company ticker, ESG score and year are columns.

To make the results more informative I divided the data in “General”, “High ESG” and “Low ESG” and ran a regression on each.

The “High ESG” and “Low ESG” groups both contain companies that were split based on the 2014 financial year ESG score. This choice was made to avoid considering companies that “reacted” promptly to the directive by increasing their ESG scores immediately following the adoption. Any company whose score fell in the 25^{th} percentile of 2014 was classified as “Low ESG” and any company that scored above the 75^{th} percentile was classified as “High ESG”. There are 15 companies in each class.

The “General” regressions intuitively includes all companies in the dataset, meaning both “Low ESG” and “High ESG” groups as well as all companies that don’t belong to either.

I also attempted to identify forced firms and create a new “Forced” group.

To do this, I created a new data series containing the ESG score difference between 2018 and 2016 for all firms. I then considered “forced” the companies that had a difference in the 70th percentile and checked that they do not significantly overlap with other groups I identified. The intuition behind this is that firms that were forced by this regulation to report on their unsustainable practices that they would have rather kept secret would have gotten rid of these practices around the 2017 financial year, which would have resulted in a significant positive change in the ESG score for the following year.

I transformed the data and used the identified financial firms to run a regression in the same way as previously, with the year as the independent variable and the ESG score as the dependent variable.

Results I

As mentioned, we will start analysing the results by looking at the line plots and look for general patterns.

The two following graphs display ESG score on the y axis and years on the x axis (from right to left) and show both the “High ESG” and “Low ESG” groups. The right column only contains the “High ESG” companies and the right columns only contains the “Low ESG” companies. It is important to note that each graph has its own scale depending on the

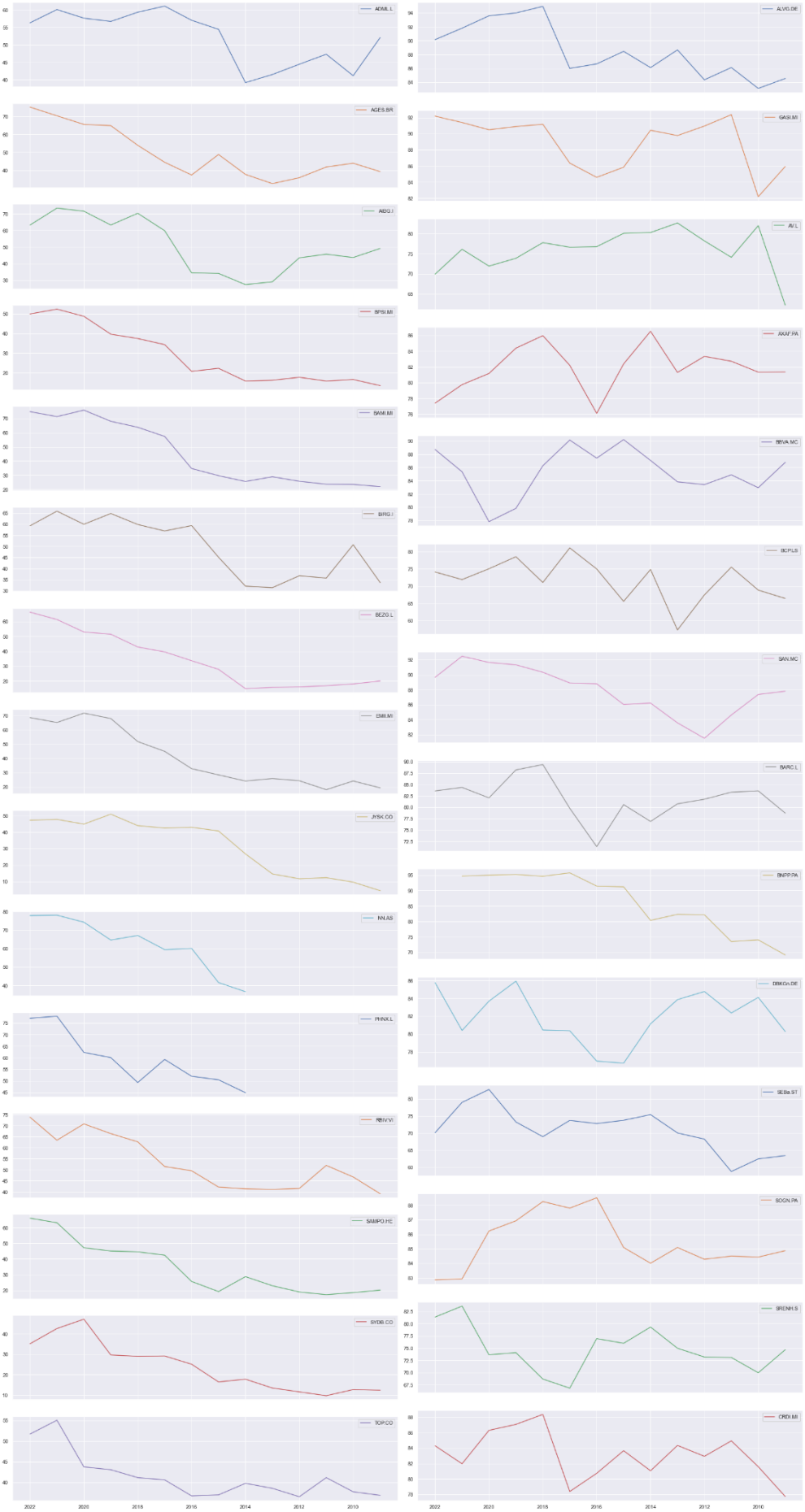
score of the specific company, meaning that they are not useful for comparing the absolute score difference between firms but only to see the evolution of said scores over the same time period.

It is immediately apparent that, apart from two that break the patterns, all companies have a higher ESG score today than at the beginning of the time series, which seems to be especially true in the case of low ESG companies.

Overall, the High ESG group, while still generally seeing an increase, has noticeably "flatter" graphs when compared to the Low ESG group. We will be able to more accurately see whether this is true once the regressions are considered.

It is interesting that both companies that saw a decrease in ESG score over the years (AXA S.A. and Société Générale S.A.) are both French companies in the High ESG category. It is intuitively not surprising that it is easier to improve a low ESG rating than improve or maintain a high ESG rating, although due to the small sample size neither the country nor the ESG performance can be considered as a pattern.

Another interesting pattern is that a few companies saw a dip in score for the 2017 financial year. As this is the first year where companies had to report under the NFRD, this pattern might be indicative of greenwashing by the affected companies, as they might have underreported certain areas of their business which they were forced to disclose more about after the directive passed. Sadly I lack the quality ESG scope data necessary to look more into this phenomenon.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CRDI.MI
TOP.CO
2022
2020
2018
2016
2014
2012
2010

We will now move to look at the regressions, starting with the “General” group one.
As one starts analysing the robustness of the regression, it could be noticed that the R-squared values are very low. While true, this does not invalidate the regression as it is expected that a regression constructed in this way, with the year as the independent variable, does not explain well the total variance of the model but is still useful to draw conclusions.

More relevantly for robustness, we can see that the regression begins very weak and starts to become significant only in 2017. Despite this, we can rely on the line plots from earlier as well as the 2017-2022 period values, where we can see that the coefficient grows significantly during the period, especially the early part (the growth rate for 2017-2019 is 51.29% but slows down at later years (the growth rate for 2020-2022 is -0.51%, with a small drop in 2022, while 2019-2021 is 22.94%), which could mean that the introduction of the NFRD’s disclosure regulation was enough for the companies to invest more in ESG-friendly issues, as hypothesised by Aghamolla and An (2023). However, as the model is weak up until 2017, we do not see a statistically significant “jump” from previous years (2014-2016), which would bring a good deal more evidence to the hypothesis.

Overall, while somewhat weak, we can see that, for the years for which we have reliable data, there is a significant growth for both the years immediately following the introduction of the NFRD (23.7% for 2017-2018) and for the whole period after (73.4% for 2017-2022), with a lowering of the growth rate towards the end of the period (-0.51% for 2020-2022).

PanelOLS Estimation Summary

Dep. Variable:	Score	R-squared:	0.0985
Estimator:	PanelOLS	R-squared (Between):	0.0985
No. Observations:	834	R-squared (Within):	0.0000
Date:	Wed, Jun 19 2024	R-squared (Overall):	0.0985
Time:	08:55:35	Log-likelihood	-3599.7
Cov. Estimator:	Unadjusted		
		F-statistic:	6.8939
Entities:	834	P-value	0.0000
Avg Obs:	1.0000	Distribution:	F(13,820)
Min Obs:	1.0000		
Max Obs:	1.0000	F-statistic (robust):	6.8939
		P-value	0.0000
Time periods:	14	Distribution:	F(13,820)
Avg Obs:	59.571		
Min Obs:	53.000		
Max Obs:	64.000		

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
const	57.476	2.5106	22.894	0.0000	52.548	62.404
Year.2010	1.8514	3.5180	0.5263	0.5988	-5.0540	8.7569
Year.2011	1.9392	3.5180	0.5512	0.5816	-4.9662	8.8447
Year.2012	0.0780	3.5180	0.0222	0.9823	-6.8275	6.9834
Year.2013	1.0898	3.5180	0.3098	0.7568	-5.8157	7.9952
Year.2014	1.1968	3.4876	0.3432	0.7316	-5.6489	8.0425
Year.2015	2.4957	3.4454	0.7244	0.4691	-4.2671	9.2584
Year.2016	4.1440	3.4067	1.2164	0.2242	-2.5428	10.831
Year.2017	8.5835	3.3945	2.5287	0.0116	1.9206	15.246
Year.2018	10.622	3.3945	3.1293	0.0018	3.9595	17.285
Year.2019	12.986	3.3945	3.8256	0.0001	6.3231	19.649
Year.2020	14.963	3.3945	4.4080	0.0000	8.3002	21.626
Year.2021	15.965	3.3945	4.7032	0.0000	9.3022	22.628
Year.2022	14.887	3.4321	4.3377	0.0000	8.1505	21.624

I expect the high variance in the data to be one of the likely culprits of the weakness of the model and expect to produce more interesting results by analysing the split High ESG and Low ESG groups' regressions, which we will do by starting to look at the High ESG regression.

Despite the model being overall stronger than the previous regression for the General group, it still becomes significant only in more recent years (2017-2022 is still the significant period). What's interesting however is that, by looking at both the coefficient

and the coefficient's confidence intervals, we can tell that it is growing at a much lower pace than the general group through the whole timeframe, with a slightly negative growth rate of -2.1% between 2017 and 2022 and a significantly negative growth rate of -25.7% from 2018 to 2022, confirming the pattern we saw earlier looking at the line plots, where we noticed the High ESG group's scores being overall flatter (and the two negative-growth companies being in the High ESG group).

PanelOLS Estimation Summary

Dep. Variable:	Score	R-squared:	0.0700
Estimator:	PanelOLS	R-squared (Between):	0.0700
No. Observations:	195	R-squared (Within):	0.0000
Date:	Sun, Jun 23 2024	R-squared (Overall):	0.0700
Time:	11:36:24	Log-likelihood	-661.36
Cov. Estimator:	Unadjusted		
		F-statistic:	1.0487
Entities:	195	P-value	0.4071
Avg Obs:	1.0000	Distribution:	F(13,181)
Min Obs:	1.0000		
Max Obs:	1.0000	F-statistic (robust):	1.0487
		P-value	0.4071
Time periods:	14	Distribution:	F(13,181)
Avg Obs:	13.929		
Min Obs:	13.000		
Max Obs:	14.000		

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
const	77.424	1.9944	38.820	0.0000	73.488	81.359
Year.2010	1.7136	2.8206	0.6075	0.5443	-3.8518	7.2790
Year.2011	2.6293	2.8206	0.9322	0.3525	-2.9361	8.1947
Year.2012	3.0414	2.8206	1.0783	0.2823	-2.5240	8.6068
Year.2013	3.1786	2.8206	1.1269	0.2613	-2.3868	8.7440
Year.2014	4.6907	2.8206	1.6630	0.0980	-0.8747	10.256
Year.2015	4.4021	2.8206	1.5607	0.1203	-1.1633	9.9676
Year.2016	3.5786	2.8206	1.2687	0.2062	-1.9868	9.1440
Year.2017	4.9964	2.8206	1.7714	0.0782	-0.5690	10.562
Year.2018	6.5864	2.8206	2.3351	0.0206	1.0210	12.152
Year.2019	7.1064	2.8206	2.5195	0.0126	1.5410	12.672
Year.2020	6.2414	2.8206	2.2128	0.0282	0.6760	11.807
Year.2021	6.5543	2.8206	2.3238	0.0212	0.9889	12.120
Year.2022	4.8910	2.8743	1.7017	0.0905	-0.7804	10.562

Interestingly the change between 2017 and 2018 is much higher than for the general group (31.8% and 23.7% respectively). This might not be relevant as the first reports were to be published for the 2017 financial year and, as we still do not have a significant and satisfactory “jump” so we move on to the Low ESG score regression.

This regression is the strongest of the four, with both good p-values starting from 2015 and a decently high R-squared.

Interestingly we can see that the score starts growing significantly in 2015 and 2016, meaning immediately after the adoption of the NFRD in 2014, however we can see that the clear and significant “jump” in the coefficient from happens between 2016 to 2017 and 2018, with the coefficient almost doubling, with growth rates of 65.6% for 2016-2017 and 94.7% for 2016-2018. We can also see that the score keeps growing consistently after the jump (growth rates of 71.7% for 2017-2022 and 46% for 2018-2022), however the change between 2017 and 2018 is the lowest of the four regressions (17.5%).

The growth rate is overall much stronger for this group than for the High ESG group, where the growth rate for the statistically significant years (2017 to 2022) is negative (-2.1%), as opposed to a strongly positive growth rate (71.7%) for this group.

PanelOLS Estimation Summary

Dep. Variable:	Score	R-squared:	0.5764
Estimator:	PanelOLS	R-squared (Between):	0.5764
No. Observations:	200	R-squared (Within):	0.0000
Date:	Sun, Jun 23 2024	R-squared (Overall):	0.5764
Time:	11:36:24	Log-likelihood	-776.35
Cov. Estimator:	Unadjusted		
		F-statistic:	19.468
Entities:	200	P-value	0.0000
Avg Obs:	1.0000	Distribution:	F(13,186)
Min Obs:	1.0000		
Max Obs:	1.0000	F-statistic (robust):	19.468
		P-value	0.0000
Time periods:	14	Distribution:	F(13,186)
Avg Obs:	14.286		
Min Obs:	13.000		
Max Obs:	15.000		

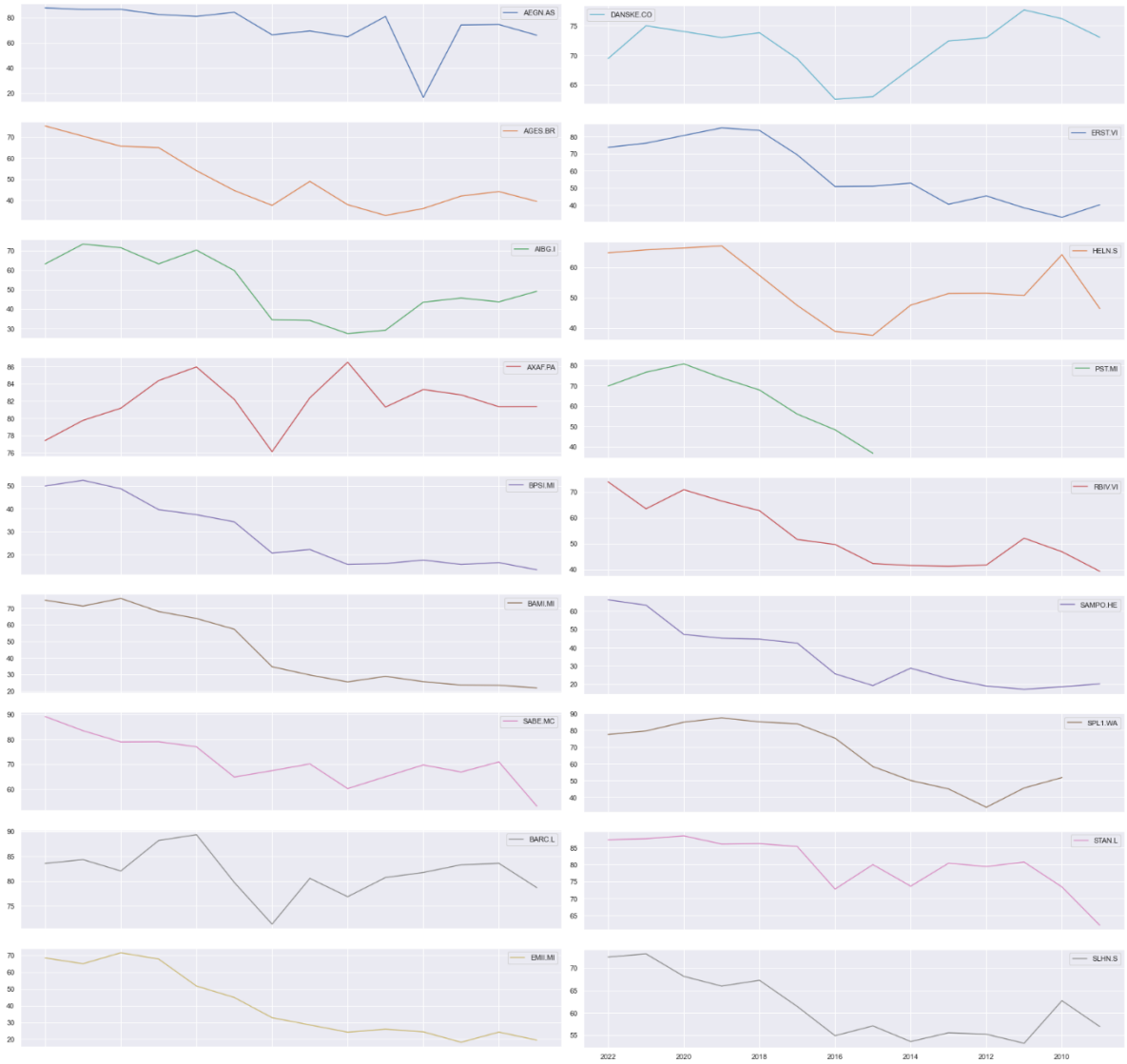
Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
const	27.848	3.3757	8.2497	0.0000	21.189	34.508
Year.2010	1.9423	4.7740	0.4069	0.6846	-7.4758	11.360
Year.2011	1.1769	4.7740	0.2465	0.8055	-8.2412	10.595
Year.2012	0.2092	4.7740	0.0438	0.9651	-9.2089	9.6273
Year.2013	-0.7669	4.7740	-0.1606	0.8725	-10.185	8.6512
Year.2014	2.3349	4.6121	0.5062	0.6133	-6.7639	11.434
Year.2015	8.0409	4.6121	1.7434	0.0829	-1.0579	17.140
Year.2016	12.304	4.6121	2.6678	0.0083	3.2054	21.403
Year.2017	20.377	4.6121	4.4181	0.0000	11.278	29.476
Year.2018	23.952	4.6121	5.1933	0.0000	14.853	33.051
Year.2019	27.911	4.6121	6.0517	0.0000	18.812	37.010
Year.2020	31.768	4.6121	6.8880	0.0000	22.669	40.867
Year.2021	35.345	4.6121	7.6635	0.0000	26.246	44.444
Year.2022	34.980	4.6121	7.5844	0.0000	25.881	44.079

These growth rate “jumps” and patterns line up with the NFRD timeline consistently and I believe the case for a causal relationship can be reasonably made, where the news of the adoption of the NFRD prompt a first smaller “jump” and the first NFRD-compliant reports in 2017 trigger a second, larger, “jump”.

As a last piece of the analysis, we can look at how the firms that were forced to comply differ from the others (and if they do). As stated before, I consider “forced” those firms which had a large growth in their ESG scores around 2017 under the (admittedly somewhat strong) assumption that this increase is not a coincidence. Although I recognize this method to not be completely trustworthy, to identify such firms quantitatively is very difficult and it lines up with the established literature. Using this method I identified 18 forced firms.

We start by looking at the plotted graphs to try and identify patterns.



The graphs are not visibly different from the High ESG and Low ESG groups, and I cannot see any obvious patterns apart from a general increase in the growth rate which seems to occur after the NFRD was passed (2014), which is not surprising and is not unique to this group.

We can look at the relative regression to look for less obvious patterns.

Sadly, the regression is quite weak and we can't rely fully on these coefficients. What we can see, however, is that there is a significant "jump" after 2017 and that the score growth flattens over time with a small drop in 2022, as already observed in the other regressions.

PanelOLS Estimation Summary

Dep. Variable:	Score	R-squared:	0.2645
Estimator:	PanelOLS	R-squared (Between):	0.2645
No. Observations:	245	R-squared (Within):	0.0000
Date:	Tue, Jun 25 2024	R-squared (Overall):	0.2645
Time:	11:32:05	Log-likelihood	-1054.1
Cov. Estimator:	Unadjusted		
		F-statistic:	6.3905
Entities:	245	P-value	0.0000
Avg Obs:	1.0000	Distribution:	F(13,231)
Min Obs:	1.0000		
Max Obs:	1.0000	F-statistic (robust):	6.3905
		P-value	0.0000
Time periods:	14	Distribution:	F(13,231)
Avg Obs:	17.500		
Min Obs:	16.000		
Max Obs:	18.000		

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
const	47.533	4.6032	10.326	0.0000	38.463	56.602
Year.2010	4.7457	6.4134	0.7400	0.4601	-7.8905	17.382
Year.2011	3.5028	6.4134	0.5462	0.5855	-9.1335	16.139
Year.2012	-0.6154	6.4134	-0.0960	0.9236	-13.252	12.021
Year.2013	2.4640	6.4134	0.3842	0.7012	-10.172	15.100
Year.2014	1.5522	6.4134	0.2420	0.8090	-11.084	14.188
Year.2015	3.0897	6.3264	0.4884	0.6257	-9.3752	15.555
Year.2016	3.5908	6.3264	0.5676	0.5709	-8.8741	16.056
Year.2017	14.626	6.3264	2.3119	0.0217	2.1609	27.091
Year.2018	21.307	6.3264	3.3680	0.0009	8.8426	33.772
Year.2019	24.017	6.3264	3.7963	0.0002	11.552	36.482
Year.2020	25.994	6.3264	4.1088	0.0001	13.529	38.459
Year.2021	26.204	6.3264	4.1419	0.0000	13.739	38.669
Year.2022	26.071	6.3264	4.1209	0.0001	13.606	38.536

We can analyse further the regression by comparing it to the "General" group regression and see if there are interesting differences.

We can see that the overall growth from 2017 to 2022 is higher in the "Forced" firms group than the "General" group regression (78.3% and 73.4% respectively), this however is likely due to a much larger coefficient change, by construction, from 2017 to 2018 when compared to the "General" group regression (45.7% and 23.7% respectively). On this, when looking at the growth from 2018 to 2022, the forced firms growth rate is much lower than the "general" firms (22.4% and 40.2% respectively), which seems to confirm that the growth in ESG performance of the "Forced" group has a lot to do with that initial increase.

Discussion I

I believe this analysis shows empirical evidence supporting the theory of Aghamolla and An on the effect of ESG disclosure regulation on ESG scores. We can assume that those who care about sustainability were not investing in low scoring firms, meaning that those firms had a largely "financial" investor bases but still saw an increase in ESG scores, as the theory predicted.

The findings are also in line with the previous study of Cicchiello et al. (2022), with the added specification of being able to distinguish between a higher growth rate in the Low ESG group and a much lower growth rate in the High ESG group, despite not being able to see in detail how much the High ESG group was influenced by the regulation.

Looking at the analysis as a whole, one can consistently see an increase in ESG scores both since 2014 (looking at the graphs) and especially since 2017 (looking at the

regressions), although we do miss a reliable regression on the effects on the higher scoring firms and for the Forced group's reaction and cannot rely on the coefficients to analyse the immediate response.

While it is true that we cannot rely much on the forced firms' data, we are able to see statistically significant growth rates and compare them with the other regression groups for most time periods, which does show interesting results, as well as compare how the different groups grew compared to one another.

High ESG	Start	End	Growth
H2017-2022	4.9964	4.891	-2.1%
H2017-2018	4.9964	6.5864	31.8%
H2018-2022	6.5864	4.891	-25.7%
H2016-2017	NOT STATISTICALLY SIGNIFICANT		
H2016-2018	NOT STATISTICALLY SIGNIFICANT		

General	Start	End	Growth
G2017-2022	8.58535	14.887	73.4%
G2017-2018	8.58535	10.622	23.7%
G2018-2022	10.622	14.887	40.2%
G2016-2017	NOT STATISTICALLY SIGNIFICANT		
G2016-2018	NOT STATISTICALLY SIGNIFICANT		

Low ESG	Start	End	Growth
L2017-2022	20.377	34.98	71.7%
L2017-2018	20.377	23.952	17.5%
L2018-2022	23.952	34.98	46.0%
L2016-2017	12.304	20.377	65.6%
L2016-2018	12.304	23.952	94.7%

Forced firms	Start	End	Growth
F2017-2022	14.626	26.071	78.3%
F2017-2018	14.626	21.307	45.7%
F2018-2022	21.307	26.071	22.4%
F2016-2017	NOT STATISTICALLY SIGNIFICANT		
F2016-2018	NOT STATISTICALLY SIGNIFICANT		

While the F2018-2022[9] period shows underwhelming growth, the overall F2017-2022 shows the highest growth rate of the four groups. While this is certainly driven by how I defined "forced" firms and the large growth of F2016-2018 (while not statistically significant in the regression table, this is how the Forced firms group was constructed), it

[9] Periods in this section will be written as presented in the table, following the same naming scheme, where the time period is preceded by the identifying letter for the group:

- High ESG group: "H"
- Low ESG group: "L"
- General group: "G"
- Forced group: "F"

is still interesting to see that these companies did not abandon their new sustainable policies after a few years.

We can see that the NFRD has had almost no effect on the ESG scores of the High ESG group over the whole period, with H2017-2022 being a measly -2.1%. This is not surprising as it would be expected that those firms which are already willingly disclosing their ESG information and are working to be more sustainable would not be impacted by this type of legislation, however we see that there is still a significantly higher growth for H2017-2018 (31.8%) and a smaller (but still significant) decrease for H2018-2022 (-25.7%). This means that the High ESG firms still improved their already high ESG performance, but ultimately lost all (and something more) of that early progress over time. This is the only group to register a negative growth rate over the analysed time periods.

It is also interesting to note that the Low ESG group, which saw the largest growth rates over the whole period (L2016-2022, not present in the table, is 184.3%) also saw the lowest growth rates in L2017-2018 (17.5%), although this is possibly due to the very large growth rates that came just before.

While the results would benefit from a higher amount of quality data and stronger statistical significance, the data we do have seems to suggest that ESG disclosure regulation does positively affect the ESG performance of both the Low ESG and Forced groups. This is interesting as it suggests that this type of regulation is effective in improving the ESG performance of both unsustainable and “environmentally stubborn” companies. It would be beneficial to be able to see how the scope of ESG disclosure changed with this directive and how ESG scope and ESG score change together and

might also help identify companies that were forced to disclose but did not significantly improve their ESG performance in the process.

It is important to note that one potentially major flaw in this analysis is the reliability of ESG scores.

With fictitious carbon offsets and other such practices, there is a risk that a large part of the growth we saw was simply due to greenwashing practices that do not show properly in reports, with this problem being brought up in by CIOs surveyed by McKinsey "ESG scores today, unlike financial ratings, don't correlate fully among ESG score providers. While financial ratings correlate at around 99 percent among providers, ESG ratings can correlate at less than 60 percent because of the different elements and weighting each agency assigns to various ESG metrics."[10]

It is imperative that future regulation has the goal of eliminating this behaviour or highlighting it in reports, as that seems to have a significant effect at least in those firms which score low on sustainability, and provide clear frameworks for the development of ESG scores, which must become a reliable indicator for investment decisions for both sophisticated and unsophisticated investors alike.

Data and Methodology II

[10] Investors want to hear from companies about the value of sustainability, McKinsey 2023

We move on to the performance analysis, for which I downloaded a different “industrial” dataset from Refinitiv, containing not 14 but 12 years of market capitalization data (in millions of euros) for each “financial” firm (still according to GICS), and matched the firms with the list of firms already used in the previous analyses, at first recreating the groups I already defined earlier but later changing slightly the requirements for firms to be classified in the Low ESG group.

I proceeded to transform the data in a similar way as previously by transposing and stacking the dataset, with the key difference that here each row is comprised of a year, ticker, ESG score and market cap instead of year, ticker and ESG score.

The analysis is structured in the same two-step way, although in this section I visualized the data through plots and ran regressions simultaneously instead of sequentially. This allowed me to use scatter plots and scatter plots with overlayed linear regression, which here had the market cap as the dependent variable and the ESG score as the independent variable.

It is important to note that the regressions are still going to be linear regressions over the four groups. This is done to compare easily the differences between those groups, although this means that it is possible that the analysis of just one group could have yielded more fitting results if a different type of regressions was used (as happened with the General group).

As the findings visually aligned with the threshold mechanic found by D’Amato et al. (2022) in the EBIT profitability of companies, I decided to use a different definition of Low and High scores by setting a threshold of 60, which is the same threshold found by

D'Amato et al. (2022)[11], with all companies above falling in the "High" category and all companies below falling in the "Low" category.

This was done in order to properly compare the findings of the following analysis with those of D'Amato et al. (2022). While this does change the data, the change in definition is not radical and does not dramatically change the firms that are part of the Low ESG group.

Results II

I started the analysis with the linear regression of the General group, which, while having a relatively low R-squared value, has satisfyingly low P-values for the coefficient so it looks overall reasonably statistically significant.

When we look at the coefficients however, while we have a positive coefficient that suggests that valuation increases with ESG score, we also have a negative intercept. While very low ESG scores (sub-20) are rare, this regression is suggesting that firms need an ESG score in the low 30s to have a positive market valuation.

As several companies in the dataset score well below 30 (and obviously have a positive market valuation), I interpreted this as the sign of a non-linear relationship which is not

[11] "Profiles could be split into three clusters: one for a group of firms with a remarkable increase in the predicted EBIT for an ESG score higher than 60 (with the average represented by the green line), one with a slight increase of the predicted EBIT for an ESG score higher than 60 (with the average represented by the blue line), and one with almost constant predicted EBIT values (with the average represented by the red line)", D'Amato et al. (2022), p.13

well represented by the linear regression that I just ran. I decided to not change the regression type for this group as I want to be able to easily compare the different groups in more detail that what would be possible with the use of different regression methods for the different groups.

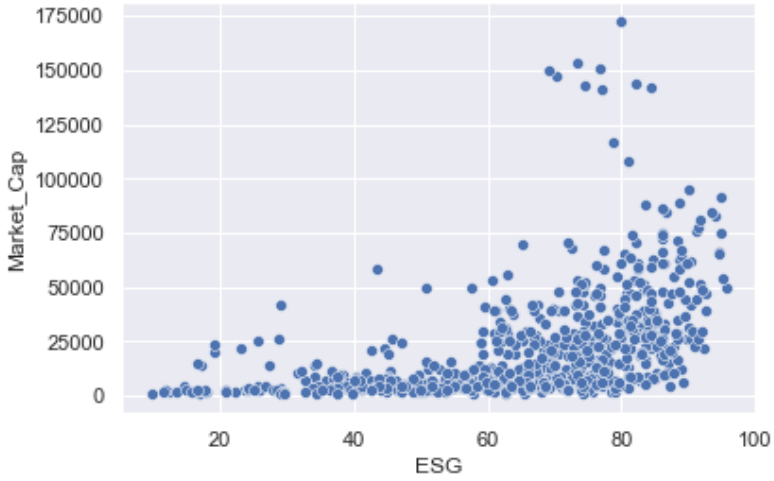
Dep. Variable:	Market_Cap	**R-squared:**	0.225
Model:	OLS	**Adj. R-squared:**	0.224
Method:	Least Squares	**F-statistic:**	207.6
Date:	Fri, 05 Jul 2024	**Prob (F-statistic):**	1.63e-41
Time:	12:42:48	**Log-Likelihood:**	-8178.0
No. Observations:	718	**AIC:**	1.636e+04
Df Residuals:	716	**BIC:**	1.637e+04
Df Model:	1		
Covariance Type:	nonrobust		

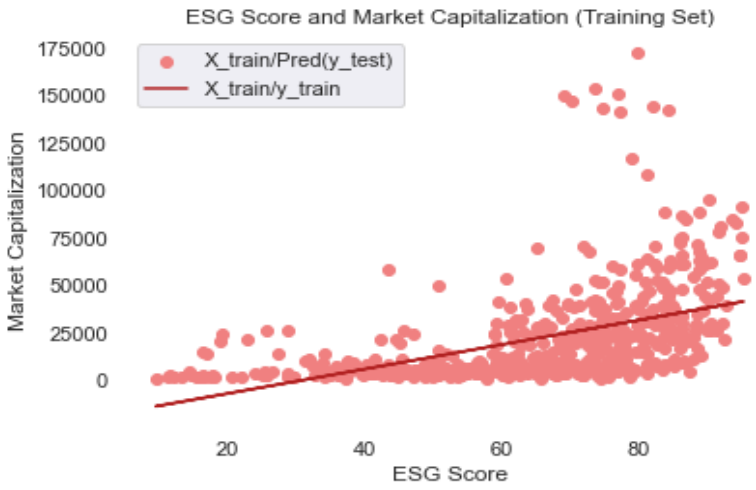
	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
const	-1.928e+04	2916.093	-6.610	0.000	-2.5e+04	-1.36e+04
ESG	619.6883	43.010	14.408	0.000	535.248	704.129

Omnibus:	463.909	**Durbin-Watson:**	2.085
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	5392.924
Skew:	2.778	**Prob(JB):**	0.00
Kurtosis:	15.223	**Cond. No.**	247.

To better understand whether there is a non-linear relationship at play, I used scatter plots to visualize the relationship of the General group.

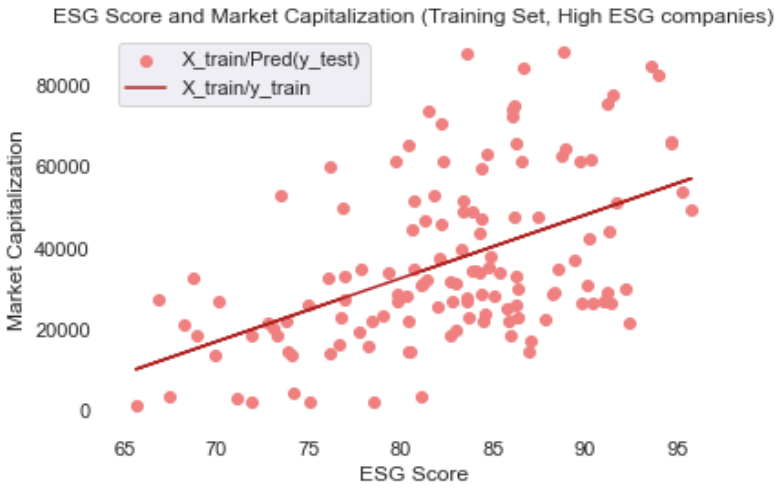
The issue becomes most obvious when we plot the regression over the scatter plot. There is an evident upward “shape” and a very clear “elbow” when approaching higher ESG scores, with valuations staying consistently low up until a certain ESG threshold of around 60, below which the market capitalization mostly stays below 10 billion euros. This is probably the key to the issue of using a linear regression for this data as the relationship between Market cap and ESG scores does not appear to be linear overall. Thankfully for the analysis, the data above and below the threshold seems to act more linearly and I expect to see better results when we split the data in High and Low ESG scoring firms and run the regression again.





It is also interesting that, above the 60 ESG score threshold, there still are a lot of low market cap firms, meaning that overall a randomly selected low valued firm might score anywhere on the x axis (ESG score), while a high valued firm will certainly score above 60 according to the Refinitiv ESG score.

We can analyse the split groups data, starting with the High ESG (above 60) group.



We now have a much more obvious upward trend without a defined “elbow” and a much more “traditional” looking scatter plot, which looks like a very obvious positive relation

between valuation and ESG performance for the “ultra-60” group. This upward trend is confirmed by running the corresponding regression on the High ESG group.

While still having a negative intercept this regression puts all values in the group in sensible, positive values and shows a strong positive relation.

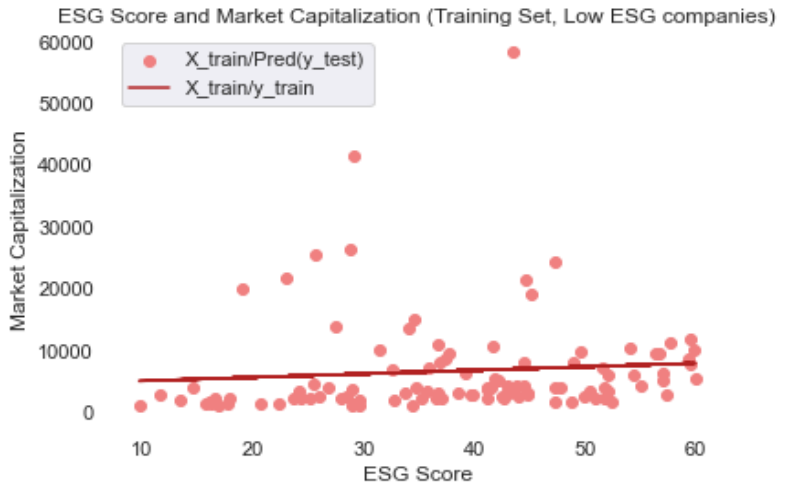
The regression seems to be trustworthy and the coefficient reliable, with low p-values and an R-squared of 0.287, confirming the statistical significance of the positive relation.

Dep. Variable:	Market_Cap	**R-squared:**	0.287
Model:	OLS	**Adj. R-squared:**	0.283
Method:	Least Squares	**F-statistic:**	66.55
Date:	Fri, 05 Jul 2024	**Prob (F-statistic):**	8.25e-14
Time:	12:53:24	**Log-Likelihood:**	-1875.6
No. Observations:	167	**AIC:**	3755.
Df Residuals:	165	**BIC:**	3761.
Df Model:	1		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
const	-9.532e+04	1.62e+04	-5.873	0.000	-1.27e+05	-6.33e+04
ESG	1603.6000	196.572	8.158	0.000	1215.479	1991.721

Omnibus:	10.080	**Durbin-Watson:**	2.219
Prob(Omnibus):	0.006	**Jarque-Bera (JB):**	10.072
Skew:	0.557	**Prob(JB):**	0.00650
Kurtosis:	2.545	**Cond. No.**	943.

We can move on to analyse the sub-60 “Low ESG” group by looking at the group’s scatter plot.



We can immediately see that, apart from a few outliers, the scatter plot is spectacularly flat, seemingly confirming the non-linearity of the two groups I hypothesized earlier by showing companies receiving very little to no benefit at all from the increases in their ESG performance while at lower levels.

Sadly I cannot rely on the Low ESG group regression for more evidence of the non-linearity of this relationship as the results are somewhat weak, with an R-squared of just 0.01 and a P-value of 0.184, meaning that we can rely only on the graph to draw conclusions when it comes to the sub-60 groups.

Basing one’s conclusions on the scatter plot, it is reasonable to suggest that ESG performance has some kind of increasing returns, however the positive effect seems to come into play suddenly after the 60-score threshold after having little influence in the 0-60 ESG score range.

Further analysis which will not be part of this study would be required to describe this relationship more clearly and in more exhaustive detail.

Dep. Variable:	Market_Cap	**R-squared:**	0.010
Model:	OLS	**Adj. R-squared:**	0.004
Method:	Least Squares	**F-statistic:**	1.776
Date:	Fri, 05 Jul 2024	**Prob (F-statistic):**	0.184
Time:	12:49:28	**Log-Likelihood:**	-1794.1
No. Observations:	174	**AIC:**	3592.
Df Residuals:	172	**BIC:**	3598.
Df Model:	1		
Covariance Type:	nonrobust		

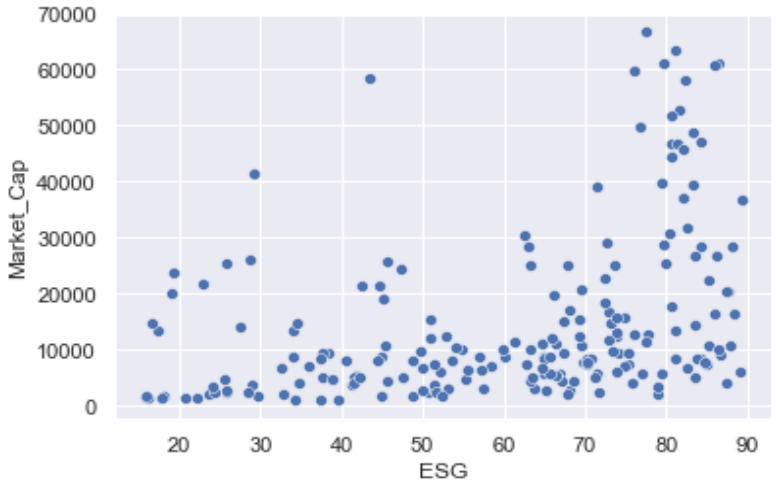
	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
const	5020.5145	1517.323	3.309	0.001	2025.543	8015.486
ESG	41.9371	31.470	1.333	0.184	-20.181	104.055

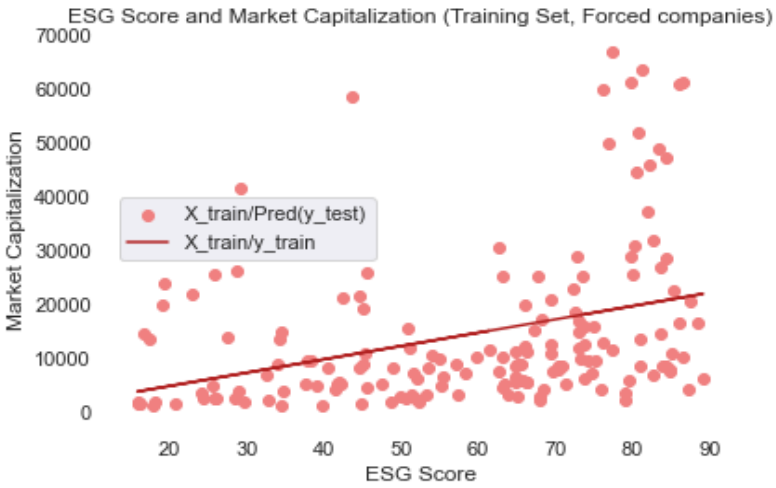
Omnibus:	159.253	**Durbin-Watson:**	2.151
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	2366.546
Skew:	3.466	**Prob(JB):**	0.00
Kurtosis:	19.684	**Cond. No.**	132.

We move on to the “Forced” group’s scatter plot as the last piece of the performance analysis.

While the range of ESG scores is wide, we can immediately see that this scatter plot features a much less pronounced “elbow” in the data. This is because the highest possible market capitalization value for the graph is much lower, meaning that much of the companies making up the “High ESG-High Valuation” companies in the general population are not considered “Forced” under my definition.

The absence of most “High ESG-High Valuation” companies results in a much more visually “balanced” graph, with several “Low ESG-High Market Cap” firms present in the group, which were considered outliers. There however still is a much larger number of High Market Cap firms in the right part of the graph meaning that, as confirmed by the regression graph, there still seems to be an overall positive trend.





It is however important to quickly go back to the issue of the absence of the higher valued companies from this group. While this does decrease the strength of the correlation, it could simply be that the market valuation benefits of higher ESG performance are seen

in longer time frames than the ones analysed (2014-2022), or that the High ESG-High Valuation companies in the High ESG and General groups have higher valuations due to when the higher ESG scores were achieved and this is not a difference in response of the Forced group.

Another important point is the presence of several of the previously-considered "outliers". While a coincidence is still possible, their presence could be highlighting a difference in response or nature of the Forced firms specifically as opposed to the other groups. I believe, however, the fact that these "outliers" are not so prominently featured in the Low ESG group's scatter plot eliminates the hypothesis that these are "conservative" firms, hanging on to unsustainable (but profitable) business practices, as these types of firms do not have an incentive to quickly revive their ESG performance and would thus not show up frequently in the Forced group.

Another, more satisfying, possibility is that these companies committed to large low-ESG investments which they were unhappy with walking away from until the last possible moment.

We move on to the corresponding "Forced" regression to confirm and compare the relation we observed.

While the results are somewhat weak, with a weak P-value for the intercept of 0.472 and a low R-squared of 0.151, the coefficient is very robust and shows a clearly positive correlation, while still less strong than the High ESG group.

Dep. Variable:	Market_Cap	**R-squared:**	0.151
Model:	OLS	**Adj. R-squared:**	0.147
Method:	Least Squares	**F-statistic:**	36.04
Date:	Fri, 05 Jul 2024	**Prob (F-statistic):**	8.84e-09
Time:	12:42:53	**Log-Likelihood:**	-2233.2
No. Observations:	204	**AIC:**	4470.
Df Residuals:	202	**BIC:**	4477.
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-2159.3957	2997.845	-0.720	0.472	-8070.479	3751.688
ESG	282.7260	47.096	6.003	0.000	189.864	375.588

Omnibus:	59.703	**Durbin-Watson:**	2.121
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	108.359
Skew:	1.508	**Prob(JB):**	2.95e-24
Kurtosis:	4.911	**Cond. No.**	197.

Discussion II

In conclusion, while overall there seems to be a correlation between ESG scores and Valuation, this seems to mostly be true above a 60 ESG score threshold, with a strong positive correlation in the High ESG group and a visibly “flat” correlation in the sub-60 group, with an ever so slight positive slope in the graphed regression line.

I am not able to provide a fully satisfying explanation as to why this thresholde exists, however I see the most obvious possible explanation for this to be investment screens,

with higher ESG scores benefiting from increased investment by large ESG-mindful funds and institutional investors (e.g. funds that only invest in firms which have an ESG score above a certain amount) as they increase their ESG scores past some sort of threshold that these type of funds use in order to consider a company for an "ESG" fund. This could also explain at least in part the positive correlation that occurs once the 60-score threshold is actually surpassed, with more and more insitutional investors accepting the ESG perfoming company as part of their ESG funds, meaning that the 60-score threshold represents some sort of industry "floor" when it comes to investment screens.

It is important to note that the 60 ESG score threshold was also found by D'Amato et al. (2022) as part of their study on the relationship of ESG performance and EBIT profitability. The article found that EBIT profitability is impacted (positively) by ESG score mostly when the firm is "quite active toward sustainability and invest to change the business model to comply with ESG criteria, this translates into higher ESG scores, usually higher than 60"[12], which would seem to suggest a causal link between ESG score and valuation, as a strong ESG performance would result in higher EBIT, which would necessarily result in a higher valuation. It is also possible that a combination of effects is at play, where there is a positive effect is initiated by an increase in the ESG score, by increasing the EBIT profitability of the company, which in turn increases valuation and at the same time qualifies the company to be invested in by several ESG funds (as suggested previously), which increase the valuation even further by buying stock in the company.

This "dual effect" interpretation however does have the issue of creating a very obvious incentive for companies to increase their ESG performance as much as possible,

[12] D'Amato et al. (2022), p.16

meaning that it is not properly explained why more companies don't commit to ESG principles, if an increase in ESG performance has a positive effect for profitability and valuation.

In order to better understand what is at play here, it would be beneficial to see if this increase in valuation is proportional to the increase in profitability, which would help understand whether a one-to-one causal relationship between EBIT profitability and ESG performance is what is possibly causing the increased valuation or there is some added force that is pushing up these valuations (e.g. ESG investment screens).

Interestingly, the other similarity of these findings with D'Amato et al. (2022) is that the results are also in contrast with Ioannou and Serafeim (2017), which found ESG disclosure levels (not ESG score levels) to have diminishing returns on firm valuation, as opposed to the "increasing" threshold.

The complete absence of the High ESG-High Market Cap firms from the Forced group is also very interesting, as it could mean that the beneficial effects of High ESG scores are less powerful in those firms which were forced to comply to regulation as opposed to those which naturally committed to sustainability. As mentioned above, apart from a different response or nature of the "Forced" firms it could also simply be that benefits on valuation manifest after a longer timeframe than the one observed in the analysis.

The presence of many of the "Low ESG-High Market Cap" firms in the same group could be explained in several ways, but I find the most satisfying to be that some of these companies had already committed large capital to Low-ESG (but profitable) investments which they were unhappy walking away from and did so at the last possible moment. I favour this explanation over the already mentioned "Conservative firms" one as I believe

this to be consistent with the rest of the data as it does not need these firms to show up in other groups for it to be reasonable.

Conclusion

Now that the two sections are complete, we can have a complete view of the study by bringing together the results for both analyses and we can reasonably conclude that ESG disclosure regulation seems to have a beneficial effect both for ESG performance and firm valuation.

Notably the increase in ESG performance is not seen in those companies which were already top ESG performers before the introduction of the NFRD in 2014, but is visible in the General, Low ESG and Forced group, although with varying significance.

We can also see that there is a correlation between high ESG scores and valuation also when it comes to the Forced group. As detailed, there seems to be some sort of increasing returns in the valuation benefits that an increased ESG performance brings to companies. This was however not observed through a dedicated regression but instead through the two split linear regressions and is an interpretation of an observed sudden "steepening" of the correlation around a threshold close to the 60 ESG score mark.

I tried giving an explanation of this sudden change in the relationship by suggesting that it could be linked to ESG investment screens, which might set a certain threshold below which companies are not eligible to be considered for investment.

This would be theoretically consistent with increasing returns as different ESG funds will set different ESG score thresholds for their investments, meaning that the more a firm increases their ESG performance past the minimum threshold the more funds the company is eligible to be part of.

It is important to keep in mind that D'Amato et al. (2022) also found the same threshold of 60 when looking at EBIT profitability of companies and explained it, in the concluding remarks, by theorising that "[to have an impact the EBIT] the company has to be quite active toward sustainability and invest to change the business model to comply with ESG criteria, this translates into higher ESG scores, usually higher than 60"[13]. I don't find this explanation completely satisfying although I do believe it to be more fitting in terms of low ESG performing companies relying on outdated business models, in some way "capping" their profitability and in turn their valuation.

Regardless of the true reason behind the increased EBIT profitability found in the article, this relationship would suggest a causal link between an increase in ESG performance and an increase in valuation as an increase in EBIT will increase valuation. I believe that a combination of the two is at play, where an increase in EBIT increases valuation and at the same time "qualifying" the company for ESG investment screens. To understand whether this relationship is one-to-one or not, a specific analysis should be conducted to test if the magnitude of the EBIT profitability increase is proportional or not to the increase in valuation, as that would certainly help with understanding if there is more to the valuation increase than the EBIT profitability.

[13] D'Amato et al. (2022), p.16

This correlation is practically non-existent at lower ESG performance levels (sub-60 ESG score) with market capitalization data staying consistently below the 10 billion euro mark apart from some outliers.

An important point has to be made about the “Forced” group’s results over both sections, with special attentions to the issue of the “outliers” identifyied in the seconds section. These “outliers” represent “Low ESG-High valuation” companies, which appear to be more present in the “Forced” group than others. It could be argued that this is due to a difference how Forced firm are or respond to this type of regulation. I believe this to be the case, specifically these to be companies which had commited large investment capital to low-ESG projects before the adoption of the 2014 Directive and which they were unwilling to abandon until the last possible moment, or the 2017 financial year, which would result in a sudden increase in their ESG performance and would thus ensure them to be part of the “Forced” group.

While it was useful to break down the data in two linear regressions for the purpose of this study, it would be beneficial for this issue for different types of regressions to be used to determine what the general (non-linear) effect is and whether the benefits have increasing returns.

With this in mind, while still important to expect more from businesses and regulators, it is reasonable to be hopeful that the CSRD will have a positive impact on companies of the European Union in terms of both sustainability and financial performance, leading to a step in the right direction in the fulfilment of the European Green Deal, also for those companies that are currently opposed to the idea of complying with the ESG disclosure principles of the directive.

Limitations and future research

It is important to note that there are several limitations in this study that influence the quality and reliability of the results. In this chapter I will highlight these limitations and suggest how improvements and more in-depth analysis can be beneficial for the thorough understanding of the issues we dealt with.

The main potential issue, which might undermine much of the analysis, is that the Refinitiv dataset used does not consist of a large number of companies, which could obviously be reducing the significance of all statistical conclusions drawn here. While I tried to include most “large listed companies, banks and insurance companies ('public interest entities') with more than 500 employees”[14] clean data through the use of the Refinitiv datasets I had access to, a more accurate and defined dataset surely be beneficial as “at present, around 6 000 of the largest EU companies are required to disclose non-financial information under the NFRD”[15] and thus have a more complete look at the companies impacted by the directive. It is important also to note that these Public-interest entities are not required to be listed, meaning their data might not be readily available on Refinitiv or other easily accessible data-providers.

A second important limitation is my method of identifying “Forced” firms. While I believe it to be reasonably reliable, I see that it might appear as a strong assumption, and the

[14] NFRD Implementation Appraisal Briefing
[15] NFRD Implementation Appraisal Briefing

results would certainly improve if a stronger definition of “Forced firm” was found, which could be connected to a set of high quality ESG disclosure scope data for the selected companies. This means that many of the conclusions drawn from the “Forced” group’s results might be considered meaningless if one does not trust these companies to be “Forced”.

The third, connected, point is that my method is only aimed at identifying those “forced” firms that did comply with the regulation, while the consequence for those that did not comply are also not included in the results. This is also applicable to the other groups, where companies that might have declined due to a refusal to comply would have disappeared from the database, leaving the possibility for survivorship bias, which however would still mean (in a way) that high ESG performance is beneficial for market valuation.

The last major limitation is obviously the reliability of ESG scores as an indicator of sustainability. As mentioned in the already cited 2023 McKinsey survey, “ESG scores today, unlike financial ratings, don’t correlate fully among ESG score providers. While financial ratings correlate at around 99 percent among providers, ESG ratings can correlate at less than 60 percent because of the different elements and weighting each agency assigns to various ESG metrics.”[16] This means that, while the Refinitiv ESG scores are comparable to each other, the results are not comparable with those from studies that did not use the ESG scores from the same source.

In terms of future research, my use of linear regressions while looking at the financial performance, while very useful for understanding how the different smaller groups

[16] Investors want to hear from companies about the value of sustainability, McKinsey 2023

responded to the directive, does not work well for the General population and is not useful to understand more in detail which type of relationship hold for the general population. More in-depth analysis on this issue can also help us understand whether there are increasing returns at play, which I was unable to properly observe due to my use of linear regressions.

Another interesting possibility for further research, is trying to see how both profitability and valuation change according the ESG performance, or trying to understand whether the market valuation observed in my results are wholly explained by the EBIT profitability increase observed in D'Amato et al. (2022). This analysis, while likely still unable to understand the relationship, would absolutely aid in eliminating possibilities and point towards further research itself that could.

The last point which would give a more thorough understanding of the issues analysed, is a satisfying amount of quality ESG disclosure scope data. This would help with understanding what exactly changed with the enforcement of the disclosure directives and possibly aid us in identifying true "Forced firms", possibly including those that, against the theory, continued their unsustainable practices while fully reporting on them. A second look at the "negative" side of the "Forced" group would be interesting and would offer a more complete view of the issue.

In short, while I believe this study to be satisfying, it cannot represent more than a small look in a much bigger issue that demands to be investigated further, hopefully providing inspiration for future analysis.

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