The role of ES performance during COVID-19 pandemic: Evidence from France, Germany, Italy and Spain

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Abstract

This paper examines the impact of the ES score on company's performance during the COVID-19 pandemic in France, Germany, Italy and Spain, by employing a cross-sectional and differences-in-differences regression. The results show that during the first quarter of 2020, companies do not necessarily benefit from higher ES score. Therefore, results represent the reality of the ongoing debate regarding the ESG performance. Moreover, I demonstrate the differences in results across the countries.

Keywords: abnormal returns, COVID-19, ES, ESG, volatility

O papel do desempenho do ES durante a pandemia de COVID-19: Provas da França, Alemanha, Itália e Espanha

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Sumário

Este documento examina o impacto da pontuação ES no desempenho da empresa durante a pandemia da COVID-19 em França, Alemanha, Itália e Espanha, empregando uma regressão transversal e de diferenças em diferenças. Os resultados mostram que durante o primeiro trimestre de 2020, as empresas não beneficiam necessariamente de uma pontuação mais elevada do ES. Portanto, os resultados representam a realidade do debate em curso sobre o desempenho do ESG. Além disso, demonstro as diferenças nos resultados entre os países.

Palavras-chave: retornos anormais, COVID-19, ES, ESG, volatilidad

Le rôle de la performance des ES pendant la pandémie de COVID-19 : Témoignages de la France, de l'Allemagne, de l'Italie et de l'Espagne

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Résumé

Cet article examine l'impact du score ES sur la performance des entreprises pendant la pandémie COVID-19 en France, en Allemagne, en Italie et en Espagne, en utilisant une régression transversale et des différences dans les différences. Les résultats montrent que durant le premier trimestre de 2020, les entreprises ne bénéficient pas nécessairement d'un score ES plus élevé. Par conséquent, les résultats représentent la réalité du débat en cours concernant la performance ESG. De plus, je démontre les différences de résultats entre les pays.

Mots clés : rendements anormaux, COVID-19, ES, ESG, volatilité

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List of Abbreviations

AT	Assets turnover
BD	Germany
CAPM	Capital Asset Pricing Model
CSR	Corporate Social Responsability
ES	Environmental and Social
ESG	Environmental, Social and Governmental
FR	France
FE	Fixed Effects
IT	Italy
OPM	Operating Profit Margin
Q1, Q4	1st or 4th quartile
ROA	Return on Assets
SP	Spain

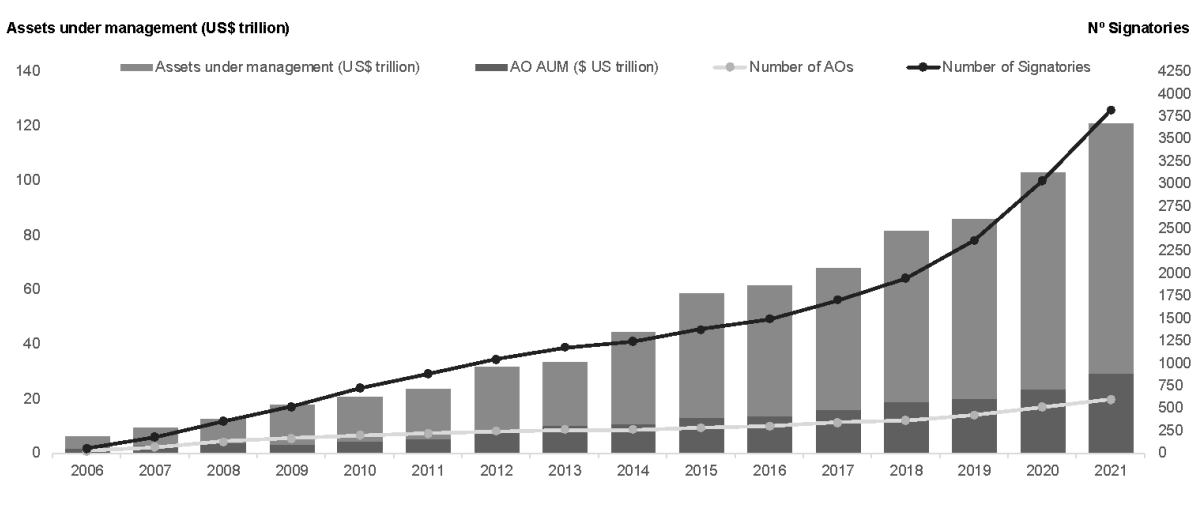
1 Introduction-Research Objective

Environmental, Social and Governance (ESG) criteria are becoming highly valuable for the different stakeholders, consequently, many financial institutions have incorporated the ESG rating into their investment process. Due to this fact, companies have realized the world is changing and for that reason considering only the financial indicators that have been used for many years is not enough, instead, the measurement of ESG performance would work better in the long run. Nowadays, there is an increase in the number and ways that companies are shifting operations towards green strategies, this means that they first identify and prioritize the ESG areas that are critical for that kind of industry and particularly that company. This could be done by an ESG materiality matrix which is a tool that helps to understand the relative importance of the specific topics that cover ESG. The different factors are measured at the same time in terms of the potential impact on the company and its importance to the stakeholders. Once the identification and prioritization of the different ESG factors is done, the organization could better define an ESG strategy specific to the company. However, the revision and remeasurement of the different topics should be done frequently as ESG is constantly evolving and new trends are continuously appearing, with priorities changing regularly as was seen when the COVID-19 started and, the focus on the health and safety of the employees became one of the most important topics. Therefore, the companies that have already prioritized and focused on these topics even before COVID-19 were more able to adapt to the abrupt environment.

Before moving on, it is important to make a clarification or distinction between CSR (Corporate Social Responsibility) and ESG. Even though these concepts could be similar in specific contexts, CSR is considered as the precursor of ESG, and years ago, CSR was the only way to refer to the actions taken by the firm in terms of Social Responsibility. However, CSR, as a company's internal commitment to responsible activities, is difficult to compare between firms or industries, while ESG factors aim to integrate it into its core business and make it a quantifiable metric for which companies receive different scores and could be ranked between them. So, a company that performs well in terms of CSR might have a higher ESG scores as well. Also, ESG strategies could be used to examine how well a company is doing in terms of CSR goals and responsibility culture of the company, so ESG policies and measurements could be seen as the quantitative side and the CSR as the qualitative one. Furthermore, to understand the increasing importance of ESG, it is needed to come back to January 2004, when Kofi Annan, the United Nations Secretary-General invited more than 50 of the most important CEOs to

participate in a joint initiative to find ways to incorporate ESG into capital markets. Under the supervision of the UN Global Compact, with the support of the Swiss Government and the International Finance Corporation (Kell, 2018). For the first time in 2006 in the UN's Principles for Responsible Investment (PRI) report, the ESG issues were started to be enforced in the financial evaluations of companies. The Principles of Responsible Investment (PRI) were created by investors. The implementation of these principles in 2006 with 63 signatories and $6.5 trillion in assets under management (AUM), and afterwards, the growth became exponential as it is shown in *Figure 1*.

Figure 1: Evolution of PRI signatories and AUM from 2006 until 2021[1]



Consequently, the different actors, such as investors, employees, customers, and overall society are interested in having a common measure and definition of ESG. For doing that, the rating agencies such as MSCI, Sustainalytics, RepRisk and ISS created their own ratings to evaluate ESG topics. Therefore, the number of ESG standards boards have been increasing, some examples are the Sustainability Accounting Standards Board (SASB), the Global Reporting Initiative, the Carbon Disclosure Project (CDP) and others. Moreover, companies can receive certifications to prove their sustainability commitment, e.g., the Certified B Corporation. The European Union law enforced companies with more than 500 employees to include non-financial statements (Directive 2014/95/EU). It is to mention that the two important parts of the EU legislation are the Non-Financial Reporting Directive (NFRD) and the Corporate Sustainability Reporting Directive (CSRD). Furthermore, it is important to note that by October 2022, it is expected that the European Commission will approve the first set of reporting

[1] Source: UN PRI https://www.unpri.org/

standards, which will define the details for the reporting areas as well as the sustainability issues. (European Commission, Corporate Sustainability reporting)

Due to the relevance of this topic, which already started a few years ago, the question that this thesis will address is the following: Does a higher ES score have an impact on the performance of the companies, especially in Europe during the COVID-19 period?

Therefore, the first hypothesis states that companies with higher ES scores are associated with higher abnormal returns. The results of the research show that a one standard deviation increase in ES score is associated with on average 0.023% higher abnormal return during the Q1 of 2020, meaning that companies with higher ES scores outperform the ones that have a lower ES score when including firm controls and control for Industry and Country fixed effects (FE). The impact is small but statistically significant at a 10% level. Additionally, results show that a high ES score, corresponds to higher daily abnormal returns during the period between February 24th and March 17th. Specifically, a 0.00182% higher daily abnormal return than companies with lower ES score.

The second hypothesis suggests that companies with high ES score also have a lower stock volatility. My results show that companies with higher ES scores are not necessarily related with lower stock returns, at least for the European companies.

The third hypothesis proposes that companies with higher ES scores will also be associated with a better operating performance based on their return on assets (ROA), operating profit margin (OPM) and assets turnover (AT). My results show that ES scores do not have any impact on the operating performance for the Q1 of 2020. However, accounting numbers do not incorporate the information immediately, e.g., as stocks do, therefore, further research could be done in order to capture the effect of the ES score during COVID-19 on these variables.

The fourth hypothesis states that the relationship between ES score and performance of a company is different for each country, meaning that hypotheses one, two and three might vary depending on the country. Effectively, the results show the differences between countries and the differences between the variables, meaning that companies from a country could benefit from a high ES score in terms of stock volatility but not in terms of abnormal return or the opposite. However, it is important to mention that results could also be biased by the small number of companies considered.

In order to get a better understanding of the COVID-19 situation, a brief summary can be found below. The first case of COVID-19 was detected in Wuhan, China in December 2019. Afterwards, it started spreading all over the world and on March 11th, 2020, the World Health Organization (WHO) declared COVID-19 as a pandemic. Consequently, borders were closed, lockdowns were imposed as well as government measures to stop the spread of the COVID-19. The world was facing a health crisis. After the development of the first vaccines, the situation improved and better days and a positive effect on the economy was observed. However, this crisis had a severe impact on the unemployment rates, and the new job vacancies are still lower compared to pre-COVID-19 in many countries.

From a capital markets perspective, in February 2020 share prices began to fall and the stock market suffered a peak where investors' sentiment and expectations about the future played a fundamental role in stock market trends. However, the impact across sectors was very different. This was observed in a study by McKinsey in 2021 where they studied the 5,000 biggest companies from over the world and they classified them into sectors. The first month of the pandemic negatively affected all sectors and some industries, e.g., aerospace, banking or insurance are still struggling to get back to pre-covid values (Chris Bradley and Peter Stumpner, 2021). On the other hand, the losses of pharmaceutical and biotechnological companies were rapidly recovered.

The COVID-19 pandemic can be seen from different perspectives. On the one hand, the society is suffering not only from a health crisis but also from an economic, financial and climate crisis. And it has emphasized the fragility of our economy. On the other hand, most of the companies have been taking actions towards digital transformation or sustainability for which most of them do not have any other option that adapt to this fast and continuously growing environment if they want to survive. Therefore, COVID-19 has created new opportunities and accelerated the company's growth regarding these trendy topics. Moreover, this disrupted situation has highlighted the importance of sustainability for which companies have fully changed their perception. Therefore, companies have been forced to take forward materiality assessment and therefore construct better sustainability strategies that look forward to a long-term plan.

The paper is organized as follows: Section 2 summarizes the existing literature. Section 3 describes the data sources and explains the methodology used. Section 4 presents and discusses the main findings. Section 5 makes a conclusion from the results.

2 Literature Review

A lot of attention from investors and corporations has indeed been paid to the emerging effect of ESG performance on firms' financial performances, therefore a lot of research was done regarding this topic, however there is still a debate regarding the ESG performance. The authors Lins et al., (2017) demonstrate that companies with higher ESG score outperformed companies with lower ESG scores during the financial crisis in 2008. The sample use is based on 1,673 non-financial companies from US and the ESG rates are extracted from MSCI. Regarding the ESG score, the researcher only considered ES and excluded the "G" (Albuquerque et al., 2020) as they considered "governance" not to be part of CSR. The period considered for calculating the raw and abnormal returns ranges from August 2008 to March 2009 and the firm control variables that they include in their regressions are similar to the ones used in my research. They were able to conclude that when including firm controls and risk factors in their regressions, the higher CSR score has worked as a "shield" during the crash period considered for the respective companies. Even though CSR scores have an impact on the stock returns during the crisis period, they did not find any statistical significance between high-CSR and Low-CSR companies during the post-crisis period, which is in line with Bouslah et al., (2018). The latter studied the impact of the financial crisis using non-financial US companies for the period between 1991 and 2012 and they ran individual regressions to measure the impact of social performance and firm risk of the companies. The researcher found a similar conclusion, since they demonstrate that high-CSR companies were able to outperform low-CSR companies depending on the period selected. These results are also in line with Nofsinger & Varma (2014), showing that ESG mutual funds outperformed conventional mutual funds only during crisis periods but not during non-crisis years. The sample used is based on US funds in the period between 2000 and 2011. In order to calculate the alpha for crisis and non-crisis periods afterwards, they find that ESG mutual funds outperformed conventional funds on average by 1.61% to 1.70%.

Additionally, the authors Albuquerque et al., (2019) demonstrate that CSR activities have an impact on the company's performance regarding its value and risks, as it is seen as part of the product differentiation strategy. The sample used is based on 4,670 US companies for the period between 2003 and 2015 and the CSR data is extracted from MSCI. This is in line with Flammer (2015), who concludes that high-CSR companies are associated with a higher company's financial performance in terms of accounting performance and announcement returns. The sample used is based on more than 1,500 US companies, and the CSR scores based on the

shareholder's proposals are extracted from RiskMetrics and SharkRepellent for the period 1997-2012. On the other hand, Revelli & Viviani, (2015) demonstrate that there is no link between a company's financial performance and socially responsible investing (SRI) by assessing a meta- analysis using 120 studies that already exist.

As a consequence of the recent COVID-19 pandemic more studies have been done with new data coming from these years in order to study the relation of ESG score and stock market performance. One of the first studies, analysing the relationship between ESG scores and the stock performance during the COVID-19 pandemic, is done by Ding et al., (2021). For their research, the sample used is based on 6,700 companies from all over the world and the control variables are coming from the pre-crisis period while the return data is retrieved for the first five months of 2020. They demonstrate that an increase of one standard deviation in ESG score is linked with a 0.13% growth of a stock return on a weekly basis during the first 5 months of 2020. Moreover, they found that companies with characteristics such as higher cash holdings or lower debt amounts are associated with higher returns during the COVID-19 pandemic. The results are in line with Albuquerque et al., (2020) who demonstrate that companies with higher ES scores will benefit from higher abnormal returns and operating profit margins as well as lower stock return volatility during the Q1 of 2020. The sample used in the paper is based on 2,171 US companies, and the ESG scores are extracted from Thomson Reuter's Refinitiv. They based their results in the different regressions, cross-sectional and difference-in-differences using as dependent variables the abnormal returns, the volatility, idiosyncratic volatility, and quarterly change in ROA, OPM and AT. Moreover, they include Industry FE and firm controls. They conclude that the increase of one standard deviation in ES score corresponds to a 0.29 decrease in volatility and with an increase of 1.8% stock returns for the Q1 of 2020. Moreover, Engelhardt et al., (2021) identified a positive relationship between ESG and abnormal returns and a negative relationship between stock volatility and ESG scores. Besides, they find that the relationship is mainly driven by the ES rather than the "G", this reinforces the reason why in my research I only considered ES and exclude the "G". Their results also show differences based on the countries, where higher ESG scores are mostly associated with lower trust or less secure countries. Overall, their research is based on 1452 European companies and the frame period they considered is smaller than the one I used which ranges from February 3rd to March 23rd, 2020. In their regressions not only abnormal returns were used as a dependent variable, but also raw returns and they include industry and Country FE for all of them, where the abnormal returns and the control variables are calculated using a similar methodology as the

one I used. Nevertheless, they clarify that their results could be biased by several considerations, the first one is the small period considered and therefore the results could be different for a long-term period research, and the second one is that the ESG data used is based on one data source and not compared with others.

In contrast, Bae et al., (2021) found that CSR does not have any effect on stock returns during the pandemic and neither during the pre-crisis period. They use 1750 US companies to demonstrate it for which they run several regressions being the dependent variable the raw and abnormal return, both for the crisis and post-crisis period. They use two databases for the ESG score, the MSCI, and Thomson Reuter's Refinitiv, and they found the same results, for the financial data they used Compustat and CRSP for the returns. Moreover, since the COVID-19 affected the industries differently, they run the regressions for the different components of the scores and as well for the different industries using the Fama French 12 industries, to have more robust results. In conclusion, they demonstrated that CSR does not benefit companies either during a non-crisis period or during a crisis period. This contradicts what other authors such as Ding et al., (2021), Albuquerque et al., (2020) or Engelhardt et al., (2021) demonstrate. However, in line with Bae et al., (2021), other authors as Demers et al., (2021), found that stock returns are not impacted by ESG scores. Their methodology is similar to the one used by Albuquerque et al., (2020) and therefore the one I used. However, for their sample, based on 1652 US companies, more control variables were added, which they considered to be related to the ESG score, and therefore they found different results, in fact contradicting to Albuquerque et al., (2020) findings. Precisely, they add more market-based, account-based variables as well as intangible investments. Once, they control for all variables that they considered to be related to the stock returns, the authors show the main drivers of the stock returns during the COVID-19 pandemic. They demonstrate that the investment in intangible assets is positively related to stock returns and statistically significant. In contrast, the ESG score or the ES score either for the first quarter of 2020 and for the whole year of 2020 is not statistically significantly related to the stock returns, while investing in intangible assets does. Nevertheless, the authors provide a clarification, saying that their study is only focused on a short-term period and not in a long-term period for which ESG score might have a higher impact. In addition, Takahashi & Yamada, (2021) demonstrate that higher ESG scores are not associated with higher abnormal returns during the COVID-19 pandemic. However, their results show that before the crisis period, the abnormal returns are positively related with ESG scores, but they became negative during COVID-19. Their conclusions are based on several regressions that used a sample of

Japanese firms, where they consider as dependent variable the abnormal returns and the returns and they included several control variables.

3 Data and Methodology

3.1 Data Sources

In the following section, a more detail explanation of the data source used in my research is given. All data is extracted from Thomson Reuters' Eikon and used to calculate the variables.

3.1.1 ESG data

All the data used is extracted from Thomson Reuters' Eikon. Specially for ESG scores, this database is one of the largest all over the world and is known for its transparency in terms of ESG score reporting. Other authors (Albuquerque et al., 2020) (Engelhardt et al., 2021) used this one for the ESG variable, but it is to mention that the use of other databases could result in different results because of the different way they measure it. In this case, Thomson Reuters' Refinitiv's information comes from company reported data, company and NGO websites, stock exchange filings, CSR reports and new sources, accordingly, this information is treated to build a score with three main pillars which includes other ten categories coming from more than four hundred different ESG metrics.

The treatment of the data is divided in different actions. Firstly, questions are examined for every company regarding different actions where the only valid answer is "no" or "yes". For instance they check whether a company has a policy regarding water-efficient or not, and if the answer is "no" or if the databases use to extract the information is incomplete or they do not find applicable data for that question, they allocate a zero. On the contrary, if the answer is yes, they allocate the value one. Nevertheless, an analysis on an industry-level is done to check whether the lack of data regarding several questions occurs among companies from the same type of industry. If that is the case, the indicator is eliminated and not considered for that type of companies. Afterwards, the methodology use to calculate the score for each category (which includes the score's answer for the different questions) is based on the following rank formula:

$$Category's\ score = \frac{nº\ firms\ with\ lower\ value + \frac{nº\ firms\ with\ same\ value}{2}}{nº\ firms\ with\ any\ value}$$

Consistently, to not have bias results based on the industries, the industry-level analysis is based on a materiality matrix. It is address based on the category's weights of each industry which is calculated with the following formula:

$$Industry\ category's\ weight = \frac{Category's\ weight}{\sum category's\ materiality}$$

For instance, as it is seen in the table 1 the environmental pillar is based on the categories of the resource use, emissions, innovation, and workforce; the social pillar consists of human rights, community, and product responsibility; and the governance pillar consists of the management, shareholders, and CSR strategy. In more detail, the emission category includes the emissions of CO2, waste, biodiversity, and environmental management systems. The innovation category includes the product innovation, research and development, green revenues, and capital expenditures. The resource use is based on the use of the sustainable packaging, energy, water, and the environmental supply chain of the company. The product responsibility is based on the responsible marketing, product quality and data privacy. The workforce considers the career development and training, , the working conditions the diversity and inclusion and the health and safety. The CSR strategy is also based on the ESG reporting and transparency. Besides, the Management is measured with the compensation and the kind of structure like independence, diversity, and committees. Lastly, the shareholders refer to their rights and the takeover defenses. Additionally, the weights given for the categories vary according to the data available, industry relevance and the materiality. (Refinitiv Eikon, 2022). However, the variable use is the weighted average of ES, so the Governance score is excluded to only capture the Environmental and Social impact as other authors also did in their papers (Engelhardt et al., 2021) (Lins et al., 2017) (Albuquerque et al., 2020). Additionally, I did not allocate the weights accordingly with the ESG weight composition made in Thomson Reuters Eikon, which would have been made based on the 34% (4%, 8%, 7% and 16%) of the Social component and 35% (11%,12% and 11%) for the environmental pillar.

Table 1: ESG Composition[2]

Pillars	Category	Indicators in scoring	Weights
Environmental	Resource use	20	11%
	Emissions	22	12%
	Innovation	19	11%
Social	Workforce	29	16%
	Human rights	8	4%
	Community	14	8%
	Product responsability	12	7%
Governance	Management	34	19%
	Shareholders	12	7%
	CSR strategy	8	4%
Total		178	100%

3.1.2 Financial data

The calculation of the abnormal returns includes a series of steps to obtain them. At first, the daily stock return index is downloaded for the years 2017 to 2019. Consequently, by using this data, the daily returns were calculated as the return of a day minus the return of the day before, all divided by the return of the day before. Moreover, the same formula is also used for calculating the daily market return indexes and the daily risk free. For the return market indexes, the CAC 40 is used for the French companies, the DAX for Germany, the IBEX 35 for Spain, the FTSE MIB for Italy. The risk-free rate used also depends on whether the companies are French, German, Italian or Spanish but in all, the 10-year country government bond is obtained from Thomson Reuters' Refinitiv.

Afterwards, the daily abnormal returns for the Q1 of 2020 are estimated as the difference of the stocks returns (measured on a daily basis) and the CAPM beta multiplied by the daily market's returns. Both, for stock and market returns, the risk-free rate from the respective countries, is subtracted. The CAPM beta is calculated using daily returns for the period between 2017 to 2019, and the corresponding market indexes. Consequently, as a result, one different beta is obtained for each stock and then used to obtain the first 2020 daily abnormal returns.

[2]Data extracted from Thomson Reuter's Refinitiv: https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Likewise, the quarterly abnormal returns are calculated with the quarterly stock returns of 2020 and with the quarterly market return and risk-free rate. However, instead of directly subtracting the quarterly risk-free rate from the stock return, the alpha is subtracted, which is the intercept between the daily raw returns of a stock minus the risk-free rate and the market raw returns minus the risk-free rate for the years 2017 to 2019. The CAPM beta is the same one used to calculate the daily abnormal return.

Additionally, the accounting data is extracted from Thomson Reuters' Refinitiv, to construct the variables. The ones considered are cash holdings, dividend yield, leverage, return on equity (ROE), size and Tobin's q, similar to other authors as Albuquerque et al., (2020) and Engelhardt et al., (2021). Since most of them are reported only yearly or quarterly, the 2019 yearly variables are considered for all of them and used for them for the Q1 of 2020.

Accordingly, the descriptive statistics are illustrated in Table 1, coming from 133 French companies, 148 from Germany, 80 from Italy and 54 from Spain.

Table 2: Descriptive Statistics of the companies from FR, BD, IT and SP

The variables' construction is defined in Table A1 in the Appendix. The sample includes 415 companies in total which includes 133 from France, 148 from Germany, 80 from Italy and 54 from Spain.

Variable	Obs	Mean	Std	Min	Max	Median
Quarterly abnormal returns	415	-0.049	0.202	-0.470	1.431	-0.069
Daily abnormal return	26,560	-0.001	0.039	-0.517	0.455	-0.002
ES	415	0.578	0.234	0.0174	0.975	0.620
Cash	411	0.137	0.123	0.002	0.925	0.106
Dividend	415	0.541	4.863	0.000	98.778	0.119
Historical Volatility	415	0.023	0.023	0.005	1.484	0.018
Leverage	415	0.311	0.180	0.000	1.242	0.304
ROE	409	8.840	24.291	-314.89	87.38	10.580
Size	414	15.680	1.770	9.976	20.347	15.592
Tobin's q	415	1.640	1.140	0.253	9.591	1.23
Volatility	415	0.040	0.114	0.008	0.106	0.039
Idio. Volatility	415	0.036	0.139	0.009	0.107	0.034
ΔROA_q	412	-1.814	7.103	-50.015	69.051	-1.054
ΔOPM_q	411	-5.748	70.687	-1055.456	415.810	-0.710
ΔAT_q	413	-7.360	13.810	-104.996	37.974	-4.335

3.2 Methodology

The methodology used is similar to the one used by Albuquerque et al., (2020). The objective of the paper is to identify the relation between the ES score and the performance of the companies during the COVID-19 period. In order to test this relationship, 4 countries from the European Union are chosen: France, Germany, Italy and Spain. Moreover, after carrying out the baseline results, I briefly did an analysis based on an individual country-level is carry out.

The first filter applied is the restriction of companies listed in France, Germany, Italy, and Spain which are the countries chosen as a sample of the European Union countries, because of their geopolitical importance and size. The second filter was the use of companies for which the ESG score was available at least from 2018 until 2020. There are some companies which are dead during these years, so they are eliminated from the sample. However, the companies that are no longer listed after the Q1 of 2020, are considered. The companies that were found during the period 2017-2019 are consider if they at least had the last 25 daily return observations of the 2019 to be able to calculate its CAPM beta. The last filter applied was the elimination of the banks, life, and non-life insurances companies to reduce any bias. Even though, the industry sectors are differently impacted, these sectors were especially critical in the previous crisis, and this time, the COVID-19 has created a high instability and change in the banks, where the government measures and aids play a fundamental role.

Once, the data is depurated, it is possible to run the regressions, and in this case two regressions were considered. The first one is the cross-sectional regression in order to analyse the relation between the performance of the company and the ES score which does not takes into consideration a specific date but a period of time which is the Q1 of 2020:

$$Performance_i = \beta_0 + \beta_1 ES\ Score_i + \sum \beta_2 Firm\ controls_i \quad (1)$$

$$+ \beta_3 Industry\ FE_i + \beta_4 Country\ FE_i + \varepsilon_i$$

Where i is the firm during the Q1 of 2020, and ε_i the error term. The dependent variable *performance* is measured in 3 different ways as three dependent variables which are the quarterly abnormal returns, the volatility, and the operating performance. The main independent variable is the ES score of firm i in 2018. I include firm controls, industry fixed effects and Country FE. Due to the fact that the industries are differently affected by COVID-19 and that the sustainability reporting is also influenced by the kind of industry sector (Bonsón & Bednárová, 2015), the industry fixed effects are included, and the classification used is the one

done in Thomson Reuters Eikon. The firm controls vary depending on the dependent variable that I want to test: for the quarterly abnormal returns and the volatility (Volatility of raw returns during the Q1 of 2020 and the idiosyncratic volatility) regressions, I control for cash, dividend yield, historical volatility, leverage, ROE, size and Tobin's q in 2019. For the operating performance regressions (ROA, OPM and AT), I control only for cash, leverage and Tobin's q.

The second kind of regression run is the difference-in-differences regression which takes into consideration the calculation of the daily abnormal returns of Q1 of 2020, which is the following:

$$Abnormal\ return_{it} = \beta_0 + \beta_1 ES_{Treatment_i} * Post_{COVID_t} \quad (2)$$

$$+ \beta_2 ES_{Treatment_i} * Post_{fiscal_t} + \beta_3 Firm\ FE_i + \beta_4 Day\ FE_t + \varepsilon_{it}$$

The dependent variable is the daily abnormal return of firm *i* during day t which belongs to the Q1 of 2020. The other three dependent variables are dummy variables, and we also want to control for industry or day fixed effects. The dummy variable TREAT_ES it's 1 for firm *i*, if it has an ES score higher than the highest quartile of that country in 2018 and zero otherwise. In order to understand the specifications made to create the Post_COVID19 and the Post_PEPP variables it is necessary first to explain the period definition consider. The event window chosen for the COVID-19 crash period starts on 24th February (Albuquerque et al., 2020). This day is considered as the start of the "fever" period, which was identified by Ramelli & Wagner, (2020). Regarding this day, apart from China, there were starting to appear COVID-19 cases in 28 other countries around the world. Therefore, the expansion of cases in Italy, Iran and Korea was starting to worry. The day before, the northern Italian authorities started putting extraordinary measures with the perspective of having to be replicated in other communities in the following days[3], in other words, the first lockdown in Europe. Moreover, the day chosen for the start of the Post fiscal period is on 18th March when both the INDEX of Germany (DAX) and France (CAC 40) reached their peak in the year 2020 and then started to increase. The indexes of these two countries are used to show the period definition because more than two thirds of the companies used, are from these two countries. As we see in the Figure 2 on 18th march, for the DAX index the price index was 8441,71 and for CAC 40 was 3754,84. The day before, on the 17th March the European Union agreed to close external borders and on 18th

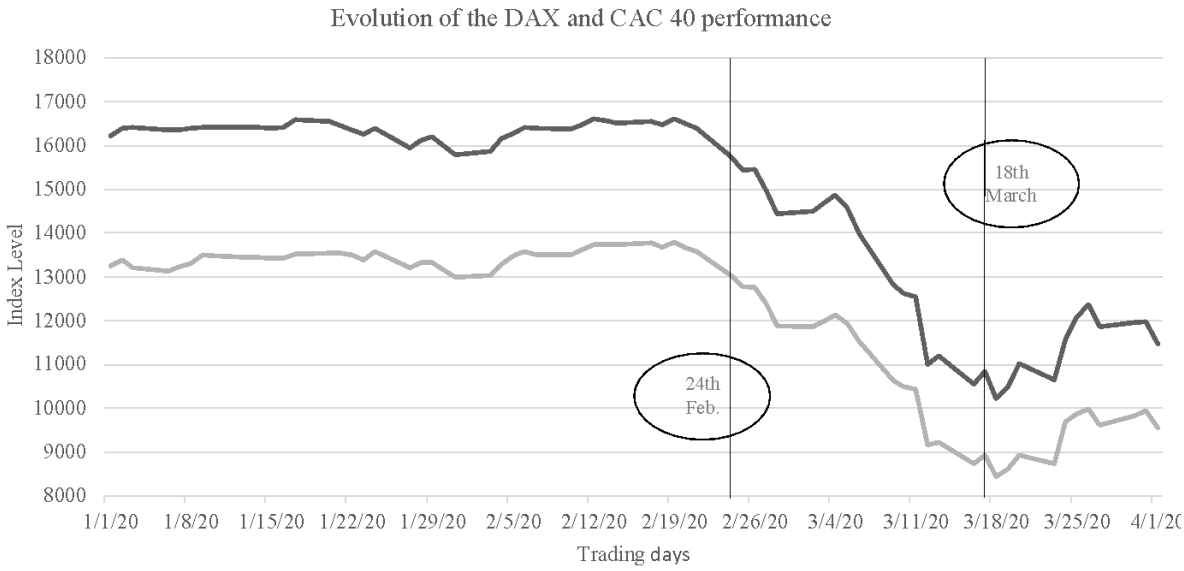
[3] Information obtained from *The Economist*: https://www.economist.com/europe/2020/02/23/italy-faces-a-sudden-surge-in-covid-19-cases

March the European Central bank announced €750 billion Pandemic Emergency Purchase Programme (PEPP)[4].

Therefore, the dummy variable Post_COVID19 takes the value one for the period 24th of February 2020 until the 31st of March of 2020 and zero otherwise. The Post_PEPP variable takes the value one for a shorter period that goes from the 18th March until the 31st of March 2020 and zero otherwise. These variables are created to have a better understanding of the effect of the COVID-19. Consequently with β_1 I want to understand if there is any link between the top ES and the abnormal return during the crisis crash period and with β_2 I want to capture the effect of the ES and the ECB policies.

Figure 2: Evolution of the DAX and CAC 40 performance

DAX and CAC 40 performance during the Q1 of 2020. The figure shows the days choosen for the beginning of the dummy variables of Post_COVID19 and Post_PEPP.



[4] Press release from the European Central Bank on the 18th of March: https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200318_1~3949d6f266.en.html

4 Empirical Result

4.1 Baseline Results

The first results are presented in Table 23 using different specifications from equation 1 for the columns (1), (2) and (3) and using as dependent variable, the quarterly abnormal returns. In column (1) and (2), the relationship between the ES and the quarterly abnormal returns is not statistically significant, and it is when controlling not only for country and industry FE but also for firm controls as well, in column (3), that the relation between ES and abnormal returns is not high but positive and significant at 10% level. In conclusion, the Table 3 illustrates that the firms that have a higher ES score, outperform the ones that have a lower ES and a one standard deviation increase in ES score (from Table 1: 0.234) is associated with on average 0.023% higher abnormal return during the Q1 of 2020. The firm controls that are significant and negatively related to the firm performance is the dividend variable and the ones that are positive related and significant are cash, historical volatility, ROE and Tobin's q. This results are similar to others authors findings, for example, when they conclude that their results cannot be explained by the leverage effect and that having cash holding helped the companies affected by the COVID-19 (Fahlenbrach et al., 2021), that the historical volatility is significant and positive related (Engelhardt et al., 2021) also firms that distribute less dividends, that have a higher ROE and Tobin's q were better pay off (Albuquerque et al., 2020). However, it is to be said that this result could be driven by the lower nº of observations and even a bit lower when including firm controls, and the fact that the companies are aggregate it in many industries.

Table 3: Regression for quarterly abnormal returns of the companies from FR, BD, IT and SP

The table present the Ordinary Least Square regression results from the equation 1 with the dependent variable being the quarterly abnormal returns for the Q1 of 2020 for France, Germany, Italy and Spain. In column (1) there is no control for industry neither country FE, column (2) controls for industry and country FE and column (3) includes firm controls and industry and country FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *,** and *** represents the 10%, 5% and 1% statistical significance respectively.

	Abnorm. return (1)	Abnorm. return (2)	Abnorm. return (3)
ES	-0.00014 (-0.34)	0.00008 (0.19)	0.00099* (1.74)
Cash			0.266*** (2.60)
Dividend			-0.035* (-1.88)
Historical Volatility			4.717*** (3.11)
Leverage			0.054 (0.86)
ROE			0.001** (2.12)
Size			-0.002 (1.74)
Tobin's q			0.024** (2.23)
Industry/Country FE	NO	YES	YES
Nº observations	415	415	403
Adj R-Squared	-0.002	0.1406	0.202

The difference-in-differences regression is presented in Table 4, and the dependent variable are the daily abnormal returns. The difference between column (1) and column (2) is that the column (2) control for firm and day FE while column (1) does not. From the results, one can said that the interaction between the TREAT_ES and the Post_COVID19 variable when controlling for day and firm FE it is positive but low, and significant at 10%. However, the interaction between TREAT_ES and Post_PEPP is not significant as also Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. (2020) already demonstrated it. In conclusion, this means that the companies with a high ES score, also have higher daily abnormal returns between 24th February and 17th March. Specifically a 0.00182% higher daily abnormal return than companies with lower ES score. These results reinforces the results in previous Table 3 but in this case the results are more precise because of the use of daily instead quarterly abnormal returns in order to better detect the effect of the ES score on firms during the COVID-19.

Table 4: Differences-in-differences regression for daily abnormal return of the companies from FR, BD, IT and SP

The difference-in-differences regression 2 is presented in the Table for France, Germany, Italy and Spain. The TREAT_ES is a dummy variable that is one if the company's ES score is in the highest quartile and 0 otherwise according to the respective countries. Post_COVID19 is a dummy variable that equals one for the period from 24th February to 31st March, 2020 and zero for 1st January till 23rd February 2020. Post_PEPP is a dummy variable that is one for 18th – 31st March period and zero for 1st January – 23rd February period. In the column (1) there are no controls for firm and day fixed effect and the column (2) yes. The dependent variable is the abnormal return The values in parenthesis represents the t-statistics. The *,** and *** represents the 10%, 5% and 1% statistical significance respectively.

	Abnorm. return (1)	Abnorm. return (2)
TREAT_ES*Post_COVID19	0.00159 (1.28)	0.00182* (1.83)
TREAT_ES*Post_PEPP	-0.00183 (-1.08)	-0.00166 (-1.04)
TREAT_ES	9.12e-06 (0.01)	
Post_COVID19	-0.00320*** (-4.87)	
Post_PEPP	0.0058*** (6.51)	
Firm FE	NO	YES
Daily FE	NO	YES
Nº observations	26,560	26,560
Adj R-Squared	0.002	0.103

I have already demonstrated it that companies with higher ES have also higher abnormal return, moreover, I will also check whether companies with high ES also have lower risk in terms of volatility. To test the relationship, the equation 1 is conducted by considering as dependent variable the volatility or the idiosyncratic volatility. The results are illustrated in Table 5 where the only ES coefficient that is significant it is in the column (5) (at 5% significance level) which considered as dependent variable the idiosyncratic volatility and I control for industry and country FE. In the columns (1) to (3) the volatility is the dependent variable and for the columns (4) to (6) the idiosyncratic volatility is considered as the dependent variable. Column (1) does not include country and industry FE, but column (2) does, and in both the relationship between the volatility and the ES score is negative, however the results are not significant. In column (4) where there are no firm controls neither country and industry FE, the relation between the coefficient ES score is positive, however, the results are not significant. Also, for the columns (3) and (6) when including firm controls, industry, and country FE the relation between

volatility or idiosyncratic volatility with ES is positive, however these results are not significant and therefore we cannot make clear conclusions. Despite the positive relationship between volatility or idiosyncratic volatility for some of the specifications of the columns that I did not expect, there is no conclusion that could be made because of the not significant results, except for the relationship between idiosyncratic volatility and ES score when controlling for country and industry FE that even low it is negative and significant. This means that companies with a high ES score are also link with a lower stock volatility, however, to be able to conclude like this it is need it that when controlling for other firm characteristics, the result will be negative as well, otherwise the relationship could be bias by other firm characteristics. These characteristics are that the companies that have a higher historical volatility during the year 2019, experience high debt levels or have a higher Tobin's q ratio, are also associated it with a higher volatility and idiosyncratic volatility for the Q1 of 2020.

Table 5: Regressions for volatility of the companies from FR, BD, IT and SP

The table presents the cross-sectional regression from equation 1, being the volatility (columns 1 to 3) and idiosyncratic volatility (columns 4 to 6), the dependent variable during the Q1 of 2020, for France, Germany, Italy and Spain. All columns except the (1) and (4) control for industry and country FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *, ** and *** represents the 10%, 5% and 1% statistical significance respectively.

	Vol. (1)	Vol. (2)	Vol. (3)	Idio. Vol. (4)	Idio. Vol. (5)	Idio. Vol. (6)
ES	-0.00001	-0.00002	0.00003	8.74e-06	-0.00006**	0.0002
	(-0.60)	(0.37)	(1.03)	(0.765)	(-2.18)	(0.65)
Cash			0.013			0.007
			(1.55)			(1.38)
Dividend			0.001			0.0002
			(1.47)			(0.21)
Historical Volatility			0.749***			0.903***
			(9.97)			(12.54)
Leverage			0.008***			0.006**
			(2.62)			(2.18)
ROE			-0.0004			-0.000
			(-1.16)			(-0.09)
Size			0.0007			-0.0001
			(0.18)			(-0.25)
Tobin's q			-0.001**			-0.001**
			(-2.35)			(-2.17)
Industry/ Country FE	NO	YES	YES	NO	YES	YES
Nº observations	415	415	403	415	415	403
Adj R-Squared	-0.0015	0.016	0.334	-0.002	0.332	0.594

The last way used to analyse the relationship between the performance of the company and the ES score is by measuring the change in operating performance of the company between the Q4 of 2019 and the Q1 of 2020. To test the relationship, in Table 6, the equation 1 is conducted by considering 3 different dependent variables. In the columns (1) and (2) the dependent variable used is the ROA. (For columns (3) and (4) the dependent variable used is the OPM (operating profit margin). For columns (5) and (6) the dependent variable used is the AT. All columns control for industry and country FE as well as for the Tobin's q variable, moreover, for columns (2), (4) and (6) I include the cash and leverage control variables.

The results show the positive relationship between OPM and the ES score and the negative relationship between the AT and the ES score as Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. (2020) also found in his paper, however, my results even related in the same, are not statistically significant and therefore I conclude that ES does not have any impact on this accounting variables during the Q1 of 2020.

Table 6: Regressions for operating performance of the companies from FR, BD, IT and SP

The table presents the cross-sectional regression from equation 1, being the dependent variable the ROA (columns (1) and (2)), OPM(columns (3) and (4)) and AT (column (5) and (6)) during the Q1 of 2020, for France, Germany, Italy and Spain. All the columns control for industry and country FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *, ** and *** represents the 10%, 5% and 1% statistical significance respectively.

Dependent variable	*ΔROA_q* (1)	*ΔROA_q* (2)	*ΔOPM_q* (3)	*ΔOPM_q* (4)	*ΔAT_q* (5)	*ΔAT_q* (6)
ES	-0.200	-0.022	0.168	0.186	-0.024	-0.031
	(-1.20)	(-1.27)	(0.96)	(1.04)	(-0.75)	(-0.94)
Tobin's q	0.905**	0.975**	2.277	2.581	-0.610	-0.394
	(2.43)	(2.46)	(0.59)	(0.63)	(-0.86)	(-0.53)
Cash		-1.545		-32.06		1.260
		(-0.40)		(-0.80)		(0.17)
Leverage		0.577		-51.67**		10.288**
		(0.25)		(-2.13)		(2.33)
Industry/ Country FE	YES	YES	YES	YES	YES	YES
Nº obs.	412	408	411	407	413	409
Adj R-Squared	0.018	0.013	-0.070	-0.059	0.064	0.0718

4.2 Comparison on Country-level

In relation to the baseline models presented in the tables above, it is done a more inside research to check if the results are different for each country and consequently test my hypothesis 4. Therefore, individual regressions are run for each country and the results are presented in Tables 7, 8, 9, and 10.

Table 7 takes as a reference the baseline results presented in Table 3. The individual regressions from equation 1 for the different countries are included. All columns control for industry FE, and the columns (5) to (8) include as well firm controls which are the same as the ones in Table 3. It is only for France, that for the two different specifications, the relationship between the abnormal returns and the ES score is statistically significant and positive. However, for Italy without the firm controls, the relationship is negative statistically significant. For Germany and Spain the relationship is negative when not including firm controls, but positive when they are included it, however the results are not statistically significant.

The Table 8 takes as a reference the baseline results presented in Table 4. The individual regressions are included from equation 2. Columns (1) to (4) do not control for firm and daily FE, while columns (5) to (8) do. The interaction between the TREAT_ES and the Post_COVID19 variable when controlling for daily and firm FE is positive when there is no firm or daily FE included, except for Italy which is negative. However, none of the results are statistically significant. When including firm and daily FE, the interaction between these two dummy variables became positive statistically significance only for France. In the case of Germany, the relation change to negative, for Italy continue being negative and for Spain is still positive but not statistically significant.

Table 9 takes as a reference the baseline results presented in Table 5. The dependent variable is the volatility of the raw return as well as the volatility of the abnormal returns. All columns include the Industry FE and from columns (5) to (8) of both tables the firm controls are included. The relation between volatility and idiosyncratic volatility with ES score for Germany is negative and statistically significant for both dependent variables, however, when there are firm controls included, even though the results are still negative, there are not statistically significant. For Italy, accordingly with the negative relationship between abnormal returns and ES score, the volatility and idiosyncratic volatility relationship with ES score is positive for all

specifications, being only significance in column (3) of Table 9. In the case of France, the situation is not what I expect, since the relationship found in the previous tables 7 and 8, was positive for the dependent variable abnormal returns. However, being the dependent variable idiosyncratic volatility and including industry FE and firm controls, the relation between the ES score is positive statistically significant, but for the other specifications is not statistically significant. In Spain, without any result being statistically significant the relation is negative for both dependent variables when there is no firm control inclusion, and positive when there is firm controls include.

Table 10 takes as a reference the baseline results presented in Table 6. The individual regressions are included from equation 2 being the dependent variable the quarterly change in ROA, in OPM and in AT. All columns control for industry FE as well as for the variables Tobin's q, cash and leverage. The relationship is negative when considering as dependent variable the quarterly change in ROA for all countries except France, but only statistically significant for Italy. In the case of the quarterly change in OPM, the relation with ES score is negative for Germany and Spain and positive for France and Italy, being as well only significant for Italy. In terms of the relationship between AT and ES score, it is negative for Germany, Italy and Spain being statisitically significant only for the last two countries, and positive and statistically significant for France.

Table 7: Comparison of regressions for quarterly abnormal returns of the companies from FR, BD, IT and SP

Regression by country. The table presents for the different countries, the Ordinary Least Square regression results from the equation 1 with the dependent variable being the quarterly abnormal returns for the Q1 of 2020. All columns control for Industry FE and columns (5) to (8) include firm controls. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *,** and *** represents the 10%, 5% and 1% statistical significance respectively.

	France	Germany	Italy	Spain	France	Germany	Italy	Spain
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ES	**0.00158****	-0.00026	**-0.00195****	-7.99e-06	**0.00278*****	0.00059	-0.00087	0.00258
	(2.25)	(-0.27)	(-2.09)	(-0.01)	(3.16)	(0.48)		(1.33)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	NO	NO	NO	NO	YES	YES	YES	YES
Nº observations	133	148	80	54	130	147	75	51
Adj R-Squared	0.115	0.077	0.151	0.224	0.344	0.178	0.306	0.422

Table 8: Comparison of differences-in-differences regression for daily abnormal return of the companies from FR, BD, IT and SP

The table illustrated, for the different countries, the difference-in-differences regression 2. The TREAT_ES is a dummy variable that equals one if the company's ES score is in the highest quartile and 0 otherwise according to the respective countries. Post_COVID19 is a dummy variable that equals one for the period from 24th February to 31st March 2020 and zero for 1st January till 23rd February 2020. Post_PEPP is a dummy variable that is one for 18th – 31st March period and zero for 1st January – 23rd February period. From column (1) to column (4) there are no controls for firm and day fixed effect and from column (5) to (8), yes. The dependent variable is the abnormal return. The values in parenthesis represent the t-statistics. The *,** and *** represents the 10%, 5% and 1% statistical significance respectively

	France	Germany	Italy	Spain	France	Germany	Italy	Spain
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TREAT_ES*Post_COVID19	0.00457	0.00010	-0.00004	0.00092	**0.04806*** **	-0.00016	-0.00017	0.00174
	(1.59)	(0.05)	(-0.02)	(0.34)	(2.94)	(-0.10)	(-0.10)	(0.79)
TREAT_ES*Post_PEPP	-0.002	-0.003	-0.003	0.003	-0.002	-0.003	-0.003	0.003
	(-0.53)	(-1.20)	(-1.20)	(0.78)	(-0.79)	(-1.17)	(-1.16)	(0.98)
TREAT_ES	-0.000	-0.001	-0.000	0.001				
	(-0.06)	(-0.48)	(-0.01)	(0.55)				
Post_COVID19	-0.005***	-0.002*	-0.003***	-0.003				
	(-3.48)	(-1.86)	(-2.80)	(-1.51)				
Post_PEPP	0.007***	0.004***	0.007***	0.004				
	(3.77)	(3.16)	(4.89)	(1.61)				
Firm FE	NO	NO	NO	NO	YES	YES	YES	YES
Daily FE	NO	NO	NO	NO	YES	YES	YES	YES
Nº observations	8,320	9,408	4,864	3,328	8,320	9,408	4,864	3,328
Adj R-Squared	0.002	0.001	0.004	0.002	0.543	0.075	0.055	0.053

Table 9: Comparison of regressions for volatility of the companies from FR, BD, IT and SP

The tables present, for the different countries, the cross-sectional regression from equation 1, being the dependent variable the volatility (Panel A)and idiosyncratic volatility (Pane B) during the Q1 of 2020. All columns control for industry FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *, ** and *** represents the 10%, 5% and 1% statistical significance respectively.

Panel A

	Vol. France (1)	Vol. Germany (2)	Vol. Italy (3)	Vol. Spain (4)	Vol. France (5)	Vol. Germany (6)	Vol. Italy (7)	Vol. Spain (8)
ES	-9.02e-06	**-0.00009****	**0.00009***	-0.00004	0.00008	-0.00006	0.00060	0.00002
	(-0.15)	(-2.04)	(1.86)	(-0.42)	(1.12)	(-1.27)	(1.08)	(0.25)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	NO	NO	NO	NO	YES	YES	YES	YES
Nº observations	133	148	80	54	130	147	75	51
Adj R-Squared	-0.082	0.078	-0.044	0.210	0.402	0.303	0.410	0.828

Panel B

	Idio. Vol. France (1)	Idio. Vol. Germany (2)	Idio. Vol. Italy (3)	Idio. Vol. Spain (4)	Idio. Vol. France (5)	Idio. Vol. Germany (6)	Idio. Vol. Italy (7)	Idio. Vol. Spain (8)
ES	0.00005	**-0.00016*****	0.00004	-0.00008	**0.00015****	-0.00005	0.00005	4.81e-06
	(0.83)	(-3.6)	(0.87)	(-0.90)	(2.23)	(-0.98)	(0.97)	(0.06)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	NO	NO	NO	NO	YES	YES	YES	YES
Nº observations	133	148	80	54	130	147	75	51
Adj R-Squared	-0.030	0.088	-0.082	0.294	0.453	0.415	0.324	0.763

Table 10: Comparison of regressions for operating performance of the companies from FR, BD, IT and SP

The tables present the cross-sectional regression, for the different countries from equation 1, being the dependent variable the return on assets (columns (1) to (4)), operating profit margin (columns (5) to (8)) and asset turnover (column (9) to (12) during the Q1 of 2020. All the columns control for industry and country FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *, ** and *** represents the 10%, 5% and 1% statistical significance respectively.

	ΔROA_q France (1)	*ΔROA_q* Germany (2)	*ΔROA_q* Italy (3)	*ΔROA_q* Spain (4)	*ΔOPM_q* France (5)	*ΔOPM_q* Germany (6)	*ΔOPM_q* Italy (7)	*ΔOPM_q* Spain (8)	*ΔAT_q* France (9)	*ΔAT_q* *Germany (10)*	*ΔAT_q* Italy (11)	*ΔAT_q* Spain (12)
ES	0.010	-0.009	**-0.0681****	-0.066	0.002	-0.010	**2.162****	-0.048	**0.139*****	-0.067	**-0.310****	**-0.165***
	(0.43)	(-0.33)	(-2.15)	(-0.68)	(0.01)	(-0.15)	(2.04)	(-0.26)	(2.63)	(-1.17)	(-2.33)	(-1.74)
Tobin's q	0.293	0.090	0.596	7.09***	-16.018	2.414*	26.739	7.029	0.712	-2.160*	-0.630	-2.390
	(0.42)	(0.15)	(-0.93)	(2.80)	(-1.32)	(1.83)	(1.24)	(1.47)	(0.47)	(-1.80)	(-0.23)	(-1.12)
Cash	-0.744	-0.975	5.843	-14.378	-65.417	2.610	-353.008	3.550	14.75	-5.267	31.912	-35.512
	(-0.14)	(-0.16)	(0.70)	(-0.61)	(-0.73)	(0.851)	(-1.26)	(0.07)	(1.30)	(-0.42)	(0.92)	(-1.34)
Leverage	-11.69***	-5.732	5.322	24.973**	-177.59***	-12.142	-129.079	29.788	-0.382	10.243	23.741	12.540
	(-3.53)	(-1.47)	(1.35)	(2.04)	(-3.11)	(-1.40)	(-0.98)	(1.24)	(-0.05)	(1.30)	(1.45)	(1.10)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Nº observations	132	146	77	53	132	146	77	52	132	146	77	54
Adj R-Squared	0.100	0.016	-0.038	0.298	-0.156	0.182	-0.347	0.213	0.157	0.159	-0.190	0.230

4.3 Discussion of results

The aggregate results for the 4 European countries that were analyzed demonstrate that companies with a high ES score are associated with higher abnormal returns but not necessarily with lower stock volatility. First, for the hypothesis 1, the relationship between abnormal returns and ES score is considered. These results show that when including Industry and country FE as well as firm controls, the relationship is positive and statistically significant. The second regression analyzed was the differences-in-differences regressions for daily abnormal returns, where the companies with a high ES score during the period of 24th February to 17th of March are also associated with higher abnormal returns. In terms of volatility, to test the hypothesis 2, the results are a mix and the only statistically significant result is the negative relationship between the idiosyncratic volatility with ES score including industry and country FE but excluding the other firm controls. However, when including firm controls for the dependent variable volatility and idiosyncratic volatility, the relationship is positive but not significant. Therefore, one can conclude that in general, in terms of volatility, European companies with a higher ES score do not necessarily have a lower volatility return. To test hypothesis 3, in terms of the operating performance of the companies, results are not statistically significant and therefore ES score did not have an impact on the ROA, OPM, and AT during the Q1 of 2020. All in all, it is not clear that companies with high ES scores will automatically perform better regarding all variables, considering as a whole, the European companies with high ES score, would outperform in terms of abnormal returns but not in terms of volatility, this is not in line with Albuquerque et al., (2020) that they found that ES score is positive and negatively related with abnormal returns and stock returns volatility respectively for US. However, non-US companies are more ESG-aware and known for having a more positive impact rather than US companies (Amel-Zadeh & Serafeim, 2017). Therefore, results will also be sensitive to the country, for instance, the results derivated from hypothesis 4 show that French companies with high ES scores outperform in terms of abnormal returns but do not in terms of volatility, neither in terms of assets turnover. However, for German companies, the high ES score does only have a positive impact on the volatility, meaning that High-ES score companies also have lower stock volatility. In the case of Italy, companies with higher ES scores are associated with lower abnormal returns and ROA but negatively with stock volatility. However, in terms of OPM and AT, Italian companies with high ES score outperformed. In the case of Spain, the higher ES scores only have a positive impact on the AT of the companies.

5 Conclusion

To sum up, these results represent the reality of the ongoing debate regarding the ESG performance. I demonstrated that during the COVID-19 pandemic, consider as the Q1 of 2020, ES scores are not necessarily linked with all variables used to measure the performance of a company, and results vary depending on the country considered. Therefore, a higher ES score could be associated with higher abnormal returns but not necessarily with lower stock return's volatility. In general, results could vary depending on the firm controls you include in the regressions, as well as the countries and number of companies choosing to construct the sample of studies, the time period definition, the classification of the industries or the data source used. Additionally, one of the limitations of this paper is the use of only one data source to measure ES scores without any comparison with another one. The second limitation is the short period definition studied which focuses only on the short-term effect of ES on company's performance during COVID-19, but there is space for further studies to analyze the long-term impact. The last limitation is that I used 2018 ES data and therefore the results could be different depending on the years because of the change in company's ES score.

6. Appendices

Appendix A

Table A1: Definition and description of Variables. All of them are extracted from Thomson Reuters Eikon

Variable	Definition
ES	Weighted average between the Environmental and Social Pillar Score in 2018
TREAT_ES	Dummy variable that is one if the company's ES rating is in the highest quartile and 0 otherwise according to the respective countries.
Post_COVID19	Dummy variable that equals one for the period from 24th February to 31st March, 2020 and zero for 1st January till 23rd February 2020
Post_PEPP	Dummy variable that equals one for 18th – 31st March period and zero for 1st January – 23rd February period.
Abnormal Return	$Daily\ AR = (daily\ returns - rf) - \beta(Erm - rf)$ $Quarterly\ AR = (quarterly\ returns - \alpha) - \beta(Ermq - rfq)$ Where: $Daily\ return = \frac{r\,(t) - r(t-1)}{r(t-1)}$ Erm: is the daily market return $Ermq$: is the quarterly market return rfq: is the quarterly risk free α : is calculated as the intercept between the raw returns of a stock minus the risk-free and the market raw returns minus the risk free for the years 2017 to 2019. β: The CAPM beta is calculated with the daily raw returns for the years 2019 to 2019 with the market index returns.
Cash (2019)	$\frac{(Cash\ \&Short\ term\ investments)}{Total\ assets}$
Dividend (2019)	$(\frac{Dividend\ per\ share}{Price\ index})$*100
Historical volatility (2019)	Standard deviation of daily raw returns of 2019
Leverage (2019)	$\frac{Total\ debt}{Total\ assets}$
ROE (2019)	Directly extracted from Thomson Reuters Eikon, which is the net income minus the Preferred Dividends divided by the Common equity multiply by one hundred
Size (2019)	$Ln\ (sales) + 1$

Tobin's q (2019)	$\frac{Total\ assets - (Book\ Value * number\ of\ shares) + Market\ Value}{Total\ assets}$
Volatility	Standard deviation during the Q1 of 2020 of daily raw returns
Idio. Volatility	Standard deviation during the Q1 of 2020of daily *Abnormal returns*
ΔROA_q	$\Delta_q \frac{Operating\ Income\ before\ depreciation}{Total\ assets}$*100 The quarterly change of return on assets is the difference of the ROA during the Q1 of 2020 and the ROA of the fourth quarter of 2019.
ΔOPM_q	$\Delta_q \frac{Operating\ Income\ before\ depreciation}{Sales}$*100 The quarterly change of operating profit margin is the difference of the OPM during the Q1 of 2020 and the OPM of the fourth quarter of 2019.
ΔAT_q	$\Delta_q \frac{Sales}{Total\ assets}$*100 The quarterly change of assets turnover is the difference of the AT during the Q1 of 2020 and the AT of the fourth quarter of 2019.

Appendix B

Tables B: The tables present for the different countries, the Ordinary Least Square regression results from the equation 1 with the dependent variable being the quarterly abnormal returns for the Q1 of 2020. In column (1) there is no control for industry neither country FE, column (2) controls for industry and country FE and column (3) includes firm controls and industry and country FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *,** and *** represents the 10%, 5% and 1% statistical significance respectively.

Table B1: France

	Abnorm. return (1)	Abnorm. return (2)	Abnorm. return (3)
ES	0.00122*	0.00158**	0.00278***
	(1.84)	(2.25)	(3.16)
Cash			0.056
			(0.37)
Dividend			-0.060**
			(-2.16)
Historical Volatility			3.520
			(1.41)
Leverage			-0.099
			(-1.06)
ROE			0.001
			(1.44)
Size			0.004
			(0.39)
Tobin's q			0.079***
			(3.90)
Industry FE		YES	YES
Nº observations		133	130
Adj R-Squared	0.018	0.115	0.344

Table B2: Germany

	Abnorm. return (1)	Abnorm. return (2)	Abnorm. return (3)
ES	-0.00046 (-0.55)	-0.00026 (-0.27)	0.00059 (0.48)
Cash			0.524** (2.42)
Dividend			-0.039 (-0.99)
Historical Volatility			8.141*** (2.85)
Leverage			0.117 (0.88)
ROE			0.003** (2.00)
Size			0.005 (0.28)
Tobin's q			-0.017 (-0.77)
Industry FE	NO	YES	YES
Nº observations	148	148	147
Adj R-Squared	-0.005	0.077	0.178

Table B3: Italy

	Abnorm. return (1)	Abnorm. return (2)	Abnorm. return (3)
ES	-0.00019	-0.00195**	-0.00087
	(-0.25)	(-2.09)	(-0.68)
Cash			0.183
			(0.69)
Dividend			-0.061
			(-0.96)
Historical Volatility			-10.230**
			(-2.55)
Leverage			0.129
			(1.06)
ROE			-0.001
			(-0.81)
Size			-0.023
			(-1.51)
Tobin's q			0.034
			(1.61)
Industry FE	NO	YES	YES
Nº observations	80	80	75
Adj R-Squared	-0.012	0.151	0.306

Table B4: Spain

	Abnorm. return (1)	Abnorm. return (2)	Abnorm. return (3)
ES	0.00014	-7.99e-06	0.00258
	(0.11)	(-0.01)	(1.33)
Cash			0.712
			(1.41)
Dividend			-0.001
			(-0.03)
Historical Volatility			1.085
			(0.22)
Leverage			0.102
			(0.48)
ROE			0.000
			(0.08)
Size			-0.041
			(-1.71)
Tobin's q			0.075**
			(2.45)
Industry FE	NO	YES	YES
Nº observations	54	54	51
Adj R-Squared	-0.019	0.224	0.422

Appendix C

Tables C: The tables present, for the different countries, the difference-in-differences regression 2. The TREAT_ES is a dummy variable that equals one if the company's ES score is in the highest quartile and 0 otherwise according to the respective countries. Post_COVID19 is a dummy variable that equals one for the period from 24th February to 31st March 2020 and zero for 1st January till 23rd February 2020. Post_PEPP is a dummy variable that is one for 18th – 31st March period and zero for 1st January – 23rd February period. In the column (1) there are no controls for firm and day fixed effect and the column (2) yes. The dependent variable is the abnormal return The values in parenthesis represents the t-statistics. The *,** and *** represents the 10%, 5% and 1% statistical significance respectively

Table C1: France

	Abnorm. return (1)	Abnorm. return (2)
TREAT_ES*Post_COVID19	0.00457 (1.59)	0.04806*** (2.94)
TREAT_ES*Post_PEPP	-0.002 (-0.53)	-0.002 (-0.79)
TREAT_ES	-0.000 (-0.06)	
Post_COVID19	-0.005*** (-3.48)	
Post_PEPP	0.007*** (3.77)	
Firm FE	NO	YES
Daily FE	NO	YES
Nº observations	8,320	8,320
Adj R-Squared	0.002	0.543

Table C2: Germany

	Abnorm. return (1)	Abnorm. return (2)
TREAT_ES*Post_COVID19	0.00010 (0.05)	-0.00016 (-0.10)
TREAT_ES*Post_PEPP	-0.003 (-1.20)	-0.003 (-1.17)
TREAT_ES	-0.001 (-0.48)	
Post_COVID19	-0.002* (-1.86)	
Post_PEPP	0.004*** (3.16)	
Firm FE	NO	YES
Daily FE	NO	YES
Nº observations	9,408	9,408
Adj R-Squared	0.001	0.075

Table C3: Italy

	Abnorm. return (1)	Abnorm. return (2)
TREAT_ES*Post_COVID19	-0.00004 (-0.02)	-0.00017 (-0.10)
TREAT_ES*Post_PEPP	-0.003 (-1.20)	-0.003 (-1.16)
TREAT_ES	-0.000 (-0.01)	
Post_COVID19	-0.003*** (-2.80)	
Post_PEPP	0.007*** (4.89)	
Firm FE	NO	YES
Daily FE	NO	YES
Nº observations	4,864	4,864
Adj R-Squared	0.004	0.055

Table C4: Spain

	Abnorm. return (1)	Abnorm. return (2)
TREAT_ES*Post_COVID19	0.00092 (0.34)	0.00174 (0.79)
TREAT_ES*Post_PEPP	0.003 (0.78)	0.003 (0.98)
TREAT_ES	0.001 (0.55)	
Post_COVID19	-0.003 (-1.51)	
Post_PEPP	0.004 (1.61)	
Firm FE	NO	YES
Daily FE	NO	YES
Nº observations	3,328	3,328
Adj R-Squared	0.002	0.053

Appendix D

Tables D: The tables present, for the different countries, the cross-sectional regression from equation 1, being the dependent variable the volatility (columns 1 to 3) and idiosyncratic volatility (columns 4 to 6) during the Q1 of 2020. All columns except the (1) and (4) control for industry and country FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *, ** and *** represents the 10%, 5% and 1% statistical significance respectively.

Table D1: France

Dependent Variable	Vol. (1)	Vol. (2)	Vol. (3)	Idio. Vol. (4)	Idio. Vol. (5)	Idio. Vol. (6)
ES	-0.00003	-9.02e-06	0.00008	6.80e-06	0.00005	0.00015**
	(-0.54)	(-0.15)	(1.12)	(0.13)	(0.83)	(2.23)
Cash			0.014			0.140
			(1.17)			(1.23)
Dividend			-0.001			-0.005**
			(-0.55)			(-2.20)
Historical Volatility			0.480**			0.944***
			(2.40)			(5.01)
Leverage			0.001			0.001
			(0.15)			(0.17)
ROE						-0.000
						(-1.19)
Size						0.001
						(1.04)
Tobin's q						-0.003*
						(-1.85)
Industry	NO	YES	YES	NO	YES	YES
Nº observ.	133	133	130	133	133	130
Adj R-Squared	-0.005	-0.082	0.402	-0.030	-0.030	0.453

Table D2: Germany

Dependent Variable	Vol. (1)	Vol. (2)	Vol. (3)	Idio. Vol. (4)	Idio. Vol. (5)	Idio. Vol. (6)
ES	-0.00082**	-0.00009**	-0.00006	-0.00015***	-0.00016***	-0.00005
	(-2.20)	(-2.04)	(-1.27)	(-4.11)	(-3.6)	(-0.98)
Cash			0.012			0.005
			(1.33)			(0.63)
Dividend			0.001			-0.000
			(0.73)			(-0.32)
Historical Volatility			0.655***			0.753***
			(5.52)			(6.78)
Leverage			0.012**			0.008
						(1.58)
ROE			-0.000			-0.000
			(-0.59)			(-0.31)
Size			0.001			-0.001
			(0.93)			(-1.17)
Tobin's q			-0.000			-0.001
			(-0.11)			(-0.99)
Industry FE	NO	YES	YES	NO	YES	YES
Nº observations	148	148	147	148	148	147
Adj R-Squared	0.026	0.078	0.303	0.098	0.088	0.415

Table D3: Italy

Dependent Variable	Vol. (1)	Vol. (2)	Vol. (3)	Idio. Vol. (4)	Idio. Vol. (5)	Idio. Vol. (6)
ES	0.00007**	0.00009*	0.00060	0.000015	0.00004	0.00005
	(2.14)	(1.86)	(1.08)	(0.47)	(0.87)	(0.97)
Cash			-0.015			-0.001
			(-1.28)			(-0.13)
Dividend			-0.002			-0.004
			(-0.88)			(-1.42)
Historical Volatility			0.893***			0.740***
			(5.14)			(4.61)
Leverage			0.000			0.001
			(0.16)			(0.20)
ROE			0.000*			0.000
			(1.74)			(1.41)
Size			0.000			-0.000
			(0.23)			(-0.75)
Tobin's q			-0.002**			-0.001
			(-2.18)			(-1.51)
Industry FE	NO	YES	YES	NO	YES	YES
Nº observations	80	80	75	80	80	75
Adj R-Squared	0.044	-0.044	0.410	-0.010	-0.082	0.324

Table D4: Spain

Dependent Variable	Vol. (1)	Vol. (2)	Vol. (3)	Idio. Vol. (4)	Idio. Vol. (5)	Idio. Vol. (6)
ES	0.00009	-0.00004	0.00002	0.00002	-0.00008	4.81e-06
	(1.01)	(-0.42)	(0.25)	(0.22)	(-0.90)	(0.06)
Cash			0.041**			0.015
			(2.12)			(0.73)
Dividend			0.007***			0.007***
			(4.57)			(3.90)
Historical Volatility			0.790***			0.884***
			(4.14)			(4.32)
Leverage			0.018**			0.014
			(2.15)			(1.61)
ROE			-0.000*			-0.000
			(-2.01)			(-0.34)
Size			0.002**			0.001
			(2.13)			(1.07)
Tobin's q			0.001			0.001
			(0.64)			(0.59)
Industry FE	NO	YES	YES	NO	YES	YES
Nº observ.	54	54	51	54	54	51
Adj R-Squared	0.000	0.210	0.828	-0.018	0.294	0.763

Appendix E

Tables E: The tables present the cross-sectional regression, for the different countries from equation 1, being the dependent variable the ROA (columns (1) and (2)), OPM (columns (3) and (4)) and AT (column (5) and (6)) during the Q1 of 2020. All the columns control for industry and country FE. The control variables are all windsorized at 1% and the values in parenthesis represents the t-statistics. The *, ** and *** represents the 10%, 5% and 1% statistical significance respectively.

Table E1: France

Dependent variable	*ΔROA_q* (1)	*ΔROA_q* (2)	*ΔOPM_q* (3)	*ΔOPM_q* (4)	*ΔAT_q* (5)	*ΔAT_q* (6)
ES	0.020	0.010	-0.059	0.002	0.121**	0.139***
	(0.08)	(0.43)	(-0.14)	(0.01)	(2.38)	(2.63)
Tobin's q	0.825	0.293	-11.318	-16.018	1.653	0.712
	(1.28)	(0.42)	(-1.03)	(-1.32)	(1.24)	(0.47)
Cash		-0.744		-65.417		14.75
		(-0.14)		(-0.73)		(1.30)
Leverage		-11.694***		-177.59***		-0.382
		(-3.53)		(-3.11)		(-0.05)
Industry FE	YES	YES	YES	YES	YES	YES
Nº observations	132	132	132	132	132	132
Adj R-Squared	0.007	0.100	-0.244	-0.156	0.160	0.157

Table E2: Germany

Dependent variable	*ΔROA_q* (1)	*ΔROA_q* (2)	*ΔOPM_q* (3)	*ΔOPM_q* (4)	*ΔAT_q* (5)	*ΔAT_q* (6)
ES	-0.011	-0.009	-0.021	-0.010	-0.054	-0.067
	(-0.41)	(-0.33)	(-0.34)	(-0.15)	(-0.97)	(-1.17)
Tobin's q	0.205	0.090	2.786**	2.414*	-2.561**	-2.160*
	(0.37)	(0.15)	(2.23)	(1.83)	(-2.26)	(-1.80)
Cash		-0.975		2.610		-5.267
		(-0.16)		(0.851)		(-0.42)
Leverage		-5.732		-12.142		10.243
		(-1.47)		(-1.40)		(1.30)
Industry FE	YES	YES	YES	YES	YES	YES
Nº observations	147	146	147	146	147	146
Adj R-Squared	0.016	0.016	0.180	0.182	0.160	0.159

Table E3: Italy

Dependent variable	*ΔROA_q* (1)	*ΔROA_q* (2)	*ΔOPM_q* (3)	*ΔOPM_q* (4)	*ΔAT_q* (5)	*ΔAT_q* (6)
ES	-0.062**	-0.0681**	2.013*	2.162**	-0.275**	-0.310**
	(-2.05)	(-2.15)	(1.97)	(2.04)	(-2.13)	(-2.33)
Tobin's q	-0.536	0.596	18.252	26.739	-0.277	-0.630
	(-0.88)	(-0.93)	(0.90)	(1.24)	(-0.11)	(-0.23)
Cash		5.843		-353.008		31.912
		(0.70)		(-1.26)		(0.92)
Leverage		5.322		-129.079		23.741
		(1.35)		(-0.98)		(1.45)
Industry FE	YES	YES	YES	YES	YES	YES
Nº observations	80	77	80	77	80	77
Adj R-Squared	-0.027	-0.038	-0.344	-0.347	-0.202	-0.190

Table E4: Spain

Dependent variable	*ΔROA_q* (1)	*ΔROA_q* (2)	*ΔOPM_q* (3)	*ΔOPM_q* (4)	*ΔAT_q* (5)	*ΔAT_q* (6)
ES	-0.126	-0.066	-0.178	-0.048	-0.099	-0.165*
	(-0.14)	(-0.68)	(-0.11)	(-0.26)	(-1.13)	(-1.74)
Tobin's q	8.38***	7.09***	8.599*	7.029	-2.278	-2.390
	(3.32)	(2.80)	(1.88)	(1.47)	(-1.06)	(-1.12)
Cash		-14.378		3.550		-35.512
		(-0.61)		(0.07)		(-1.34)
Leverage		24.973**		29.788		12.540
		(2.04)		(1.24)		(1.10)
Industry FE	YES	YES	YES	YES	YES	YES
Nº observations	53	53	52	52	54	54
Adj R-Squared	0.242	0.298	0.222	0.213	0.210	0.230

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