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Have we moved away from the Friedman doctrine?

An Empirical Study on Corporate Social Responsibility and shareholder value

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Abstract

This thesis investigates the relation between Corporate Social Responsibility (CSR) and shareholder value by examining the impact of ESG-related incidents on stock returns over the medium term. Using an event study methodology for RepRisk incident data, I analyse the effect of incident severity, incident type (Environmental, Social, and Governance), sector heterogeneity, and initial reputation risk levels on abnormal stock returns. Our findings reveal a persistent negative relation between share value and controversies for environmental issues and environmentally exposed sectors, and a progressively larger magnitude as the ex-ante corporate risk profile increases and the severity of the incident worsens pointing at a market value relevance to ESG risk factors.

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1. Introduction

The social responsibility of business is to increase its profits. These words, attributable to Milton Friedman's seminal 1970 article in the NYT, define the stance of how a market economy relates to moral matters. Building on Adam Smith's notion that markets self-regulate, Friedman, during the 1970s - a time of strong political debate about the role and responsibility of firms towards society, particularly with respect to employees' rights - separated non-economic objectives from purely financial ones. Indeed, this view holds that the role of regulating political issues transcending direct outcomes from production and trade should be managed by regulatory entities. This separation of responsibilities between "church and state" is premised on the notion that efficiency should be maximized, and externalities should be addressed either by shareholders, who can finance non-profit projects outside the legal infrastructure of corporatism, or by the state and various civil society stakeholders (e.g., unions).

However, to put in an historical context the stance, the main moral concern from which Friedman abstracted was about the externalities impacting laborers. This issue was particularly fervid in the political economy public debate during the Cold War, a time in which the responsibility of the free-market economy was evaluated in comparison to planned economies of communist countries, whose pivotal tenet was the Marxist critique of the master-slave relation between capitalists and employees. Thus, Friedman's response clearly delineated the responsibility of companies in the West towards this socio-political identification of the times.

In recent years, western societies have been rethinking this stance. The Great Financial Crisis proved recognition to the risks that short-term reward mentalities of corporations can bring to society (Benabou et al., 2010). The apparent lack of accountability for financial corporations and the inability of markets to limit excessive risk taking sparked a trust crisis in markets as described by Zingales and Sapienza (2012). Similarly, the rise of populism in the recent years suggests that this crisis transcends economic liberalism touching upon liberal democracy too. So, as governments became unable to address externalities in the eyes of society, the public sphere shifted its attention demanding a new economic thinking for companies and financial institutions. In parallel to these political concerns, an increasing apprehension towards climate change and the green economy has become mainstream displaying how our era bears witness to one of the fastest and most visible impacts of a value shift, or development for that matter, on the global economy, namely that of Corporate Social Responsibility (CSR).

These social phenomena have revived and accelerated the trend of socially responsible investing (SRI) and brought the attention to sustainable, long-term investment, as opposed to short-termism associated with financial markets. Furthermore, the *telos* of this new paradigm is to sustain a liberal economic system throughout, and beyond, the 21st Century by expanding our perception of value creation to multiple stakeholders by incorporating externalities. For as much as it is essential to explore the reasons for sustainability – for instance, it is believed that if I do not alter our production and consumption practices, life on Earth may never be the same – the evermore growing evidence of "Greenwashing" displays a sort of tacit assent to the old standard, an exploitation of societal values without delivering on the promises in the pursuit of corporate benefits.

In this thesis, I am not concerned with the reasons behind or the methods to achieve a eudemonic standard of commercial practices, but I am rather interested in assessing whether the normative spirit of this trend is in effect taking root. Therefore, I evaluate the possibility of the paradigm shift in the market notion of value, and how the general public's perception of this new commercial morality translates into economic behaviour by bringing forward the following question: Do markets value corporate moral integrity?

Our research contributes to the growing literature on the stakeholder value and ESG risk factors relevance for shareholders across three dimensions. Firstly, by means of event study methodology I assess the impact of corporate irresponsible practice on long-term stock returns. Most of the literature focuses on short term reaction to CSR score announcements or look at long-short portfolio performance rebalanced at least on a monthly frequency. By looking at abnormal returns up to one year after the announcement of new CSR information I gauge the long-term component of sustainable investing, which is at the core of this new paradigm. Secondly, I explore a rich event based ESG related controversies dataset from RepRisk spanning the most recent 15 years, from 2007 to 2022, across 1000+ European and North American publicly listed companies pertaining to the MSCI universe. Thirdly, I provide an in-depth analysis of the composition of ESG risk factors for 24 sectors in the panel, while most of the literature glances at an industrial level with no more than 8 different clusters.

The rest of the study is organised as follows. Section 2 defines the theoretical framework and the testable hypotheses, while section 3 describes the construction and the characteristics of the dataset used. Section 4 details the event study methodology and section 5 describes the empirical findings. Finally, section 6 concludes the thesis with a discussion of the results, its limitations, and suggestions for further research.

2. Theoretical Framework

In response to Friedman's doctrine, Freeman's (1984) envisaged the stakeholder theory of the firm, which statuses that companies do have a responsibility towards their stakeholder, with these being defined as "any group or individual who can affect or is affected by the achievement of the organization's objectives". Therefore, this definition implies that shareholders are just one of many stakeholders, and one could argue, that just as companies create externalities towards non-shareholder stakeholders, returns are just a positive externality towards shareholders. So, value should be maximized for all groups, and it might take many forms. Porter and Kramer (2011) picture the concept of shared value as the relation betIen corporate and societal values. Societal needs define markets, thus corporations by embracing shared value policies can define a sustainable economic system and position themselves strategically. In this context, the notion of value creation drifts away from strict profit maximization, while CSR diverges from being an expense, as thought so by Friedman, and becomes an investment opportunity (Bosh-Badia et al, 2013).

If shared values can shape commercial practices, there exists social constraints that can do the same. North's (1991) institutional economics argues that corporations' existence and development is deeply shaped by the institutional framework in which they are present, which incentivizes and disincentivizes commercial behaviour. Institutions are by him defined as a mix of implicit and explicit constraints, the former pertaining to the universe of social norms and code of conducts while the latter to laws and regulations. Moreover, preferences shift, in terms of consumption, exemplify such transformative power of implicit constraints. Let's think of green products, recycled packaging, consistently more impactful in the demands that consumers have towards their producers. In an integrated globalized economy with easy access to information, switching costs have increasingly lowered, fostering a competition that is not anymore purely driven by cost reduction, but rather by value identification. On a similar note, Baudrillard (1998) argues that individual's identity is a function of their capitalistic consumption, where consumption values translate into symbols of the self. Thus, pressure from civil society does play a strong role in this paradigm shift.

While implicit constraints shape market dynamics and societal values, in lines with Smith's invisible hand too, explicit constraints are perhaps the strongest force for value change. In line with Pigou (1924), governments shape the playing field drawing a line between what is acceptable and inacceptable commercial practice. However, for as much as I may like to think that economic regulation is driven by sound theories, technocratic decisions are rather rare in legislation. The spirit of the law is rather the embodiment of the political sphere of the time, a by-product of civil values and norms of the people who have elected their politicians. For instance, according to the median voter theorem (Romer et al., 1979), the preferences of the moderate section of society will eventually transfer into rule of law for electoral reasons, which might be suboptimal. In fact, it has become progressively more visible, perhaps due to hyper informatization, that there is a dialectic between explicit and implicit constraints in shaping economic practice, where firms stand in between of this tension and have the necessity to satisfy both sides. According to the firm theory of contracts (Zingales 2000), the shape of firms is that of a bundle of contracts with various stakeholders (suppliers, customers, government, shareholders etc.), which reinforces the argument for companies' need to honour all sovereign parties, otherwise they will be deserted by them. Thus, CSR may take the form of a great expense if not delivered, bringing about for investment professionals a new category of factors to be attentively managed, namely ESG risks.

Environmental social and governance risks capture the long term dangers that might follow from irresponsible corporat social practice. For instance, negligence of regulatory framework might lead to serious legal and managerial costs, these being associated with the governance risk factor. Similarly, inattention to suppliers or costumers preferences could bring a loss of sales as the consumer base distance themselves to the company's products and suppliers seek different firms to partner with. In times of social media and hyperinformation social risks have accerbated as this medium of communication can drastically damage the brand value of a company. Hence, as information progressively perfects across different stakeholders, while these can evermore easily coordinate their actions, mitigation of these risks becomes essential for sustaining a competitive positioning in the global economy.

In this framework it is fundamental to keep in mind that firms still have a fiduciary duty towards shareholders, in the form of an explicit constraint by means of dividend payments, and that professional asset managers are largely evaluated in terms of financial returns. So, where does CSR stand in relation to shareholder value? Schoenmaker and Schramade (2019) claim that social preferences are equally, if not more, significant to shareholders and institutional investors as financial motives as they account for ESG risks. Moreover, if ESG risk factors are not properly managed by the firm, then these can have a long-term impact on company profitability, and conversely companies with a better ESG profile tend to have better long-term financial performance (Whelan et al., 2015). In fact, a 2019 survey by BNP on ESG Investing showed that the main driver for 350 global institutional investors to integrate ESG factors in their valuation process is to maximize long-term profitability. Therefore, shareholders are seeking the optimal quantity of CSR as a function of ESG risk mitigation such that their capital gain can be maximized in the long run. It is as if by doing good they can maximize their returns, in essence they have the cake and they eat it too. However, evaluating CSR effort or mitigating ESG risks is easier said than done.

The problem with measuring CSR performance is that there is no general standard. In fact, Halbritter and Dorfleitner (2015) find that the magnitude and direction of abnormal returns from different ESG score providers is dispersed, provider dependent and insignificant. Also, as these ratings are based on self-reported measures there is a strong degree of asymmetric information between the firm and shareholders. The shareholders that want the optimal level of CSR cannot have access to the private information of firms' actual CSR inclination and ability. Thus, this could lead to adverse selection, flooding the market with green lemons, which I could call limes. These limes render the CSR value discovery process suboptimal, and consequently, shareholders may undervalue firms with sincere CSR efforts, while firms with low CSR commitment and at high ESG risk may be overvalued, leading to an inefficient allocation of resources and potential market failure. Goodhart's Law (1984) states that when a measure becomes a target, it ceases to be a good measure. In the context of CSR ratings, firms may manipulate their CSR disclosures and engage in superficial CSR activities to meet targets, thereby rendering CSR measures less meaningful. Setting ESG/CSR targets may thus distort decision making. In fact, there is evidence of companies embracing CSR as a cover up for poor business performance, while these consistently being underperformers (Flugum et al., 2022).

As a solution, it may be more effective for shareholders to frame the effort of CSR as an attempt to avoid Corporate Social Irresponsibility (CSI). The notion refers to publicization of negative corporate behaviour by external parties (Kolbel et al., 2017), which alleviates information asymmetry. By concentrating on minimizing exposure to CSI incidents, shareholders can effectively screen firms and reduce information asymmetry based their reputation in the public sphere. A firm's reputation is an intangible asset which significantly contributes to its overall value of the firm (Kerin et al, 1998). When a firm engages in irresponsible practices or is linked to CSI incidents its reputation may be damaged leading to the destruction of firm and therefore of shareholder value (Barnett and Leih, 2018).

Following the painted theoretical framework and the foundational definition of Benabou and Tirole's (2010) seminal paper of corporate social responsibility as a long-term profit maximizing paradigm, as opposed to short-termism, I wish to test this value shift. Therefore, if CSR has been integrated in shareholder value, it would follow that when irresponsible corporate behaviour occurs the stock price adjustment would persist in the long run. Therefore, the first hypothesis that I bring forwards is the following:

Hypothesis 1: *The deterioration of shareholder value from corporate ESG-related incidents persists up to one year.*

HoIver, ESG controversies have different gravity, thus proper ESG integration would imply that as the magnitude of the consequences from irresponsible behavior worsen, so would the market response. Hence, if the degree of damage of an ESG controversies aggravates, shareholders will suffer progressively more from it, which brings about the next hypothesis:

Hypothesis 2: *Shareholders experience increasing damage in value as the severity of the firms' controversies worsen.*

Following the previous hypothesis, shareholders' perceptions of repeat offenders, recidivism, and conversely companies with fewer CSI incidents can further influence the end-result of a controversy due to a different set point. As investors exhibit learning behaviour and process new information, costs incurred from incidents might affect the share price. Further, because of sectoral differences clustering of different reputational risk companies (e.g., sin stocks) the response can differ based on the cluster. Hence, the third hypothesis is as follows:

Hypothesis 3: *The initial CSR profile of firms significantly defines the degree of loss in shareholder value in case of CSI controversies.*

An alternative approach to the last two hypotheses is that shareholders react to only explicit constraints independently of the incident severity of the initial risk profile. As the green economy and environmental concern have become widely institutionalized and regulated (see the Paris agreement for instance), and when I talk about sustainability I tend to focus on the "green", then it could be the case that climate related risks are the only relevant ones. In fact, the 2021 strategy review of the ECB illustrates climate risk, as a combination between transition and physical risk which transcends preferences and values. Moreover, social and governance risk factors are still deeply contested concepts in terms of implicit constraint, even more so from an explicit perspective. So, according to this line of thought the increase regulation for environmental risks might be the only relevant factor to shareholders in terms of CSR. To support this reasoning, Flammer (2013) finds evidence linking shareholder sensitivity to corporate environmental footprint, while, McWilliams and Siegel (2001) argue that there is no relation between financial performance and optimal quantity of CSR, but rather that CSR is a function of industry cycle. In line with this argument, I bring forward the following hypothesis:

Hypothesis 4: *Shareholder value for corporations linked to environmental incidents, or in sectors highly exposed to environmental risk, is damaged independently of ex ante CSR profile.*

3. Data Description

For measuring firms' reputational risk, I use data from Zurich based provider RepRisk. With data starting in 2007, the RepRisk dataset is constructed by screening daily 100,000+ sources from various stakeholders in 23 different languages through Ib scraping and machine learning to detect controversies. Once incidents have been identified, a team of experts assesses the quality of the machine based flag in such a way that the methodology yields the highest possible degree of consistency over time. The incidents flagged by RepRisk methodology are comprised of 101 mutually exclusive topics (see Table A.3), pertaining to UNGC principles, SDGs and ESG micro and macrocategories.

Once an incident is identified and categorized it is then rated across three dimensions:based on the severity of the incident, its reach, and the novelty of it. The severity metric determines the harshness of the criticism/incident, while the novelty corresponds to a binary variable of incident recidivism and the reach assess the importance of the news source or the mediatic fervor folloId from the event. These three metrics will then be combined into an incident score Iighted by the degree and level of the three metrics, with the severity having a maximum Iight of 95% into the single incident metric, clarifing the utmost importance of the severity above the other two metrics.

From the incident score RepRisk generates a Repuatational Risk index, an ESG score that updates when an event occurs and there is a non zero incident score, or over time if there are no controversies loIring the risk profile of the index. RepRisk assumes that for controversies to be forgotten it takes two years, thus a time dependent factor is included in the index construction, accounting for both old incidents at most in the last two years and giving most weight to novel ones by having a non linear decaying function.

At the same time to make the index comparable across firms of different sizes receiving more or less attentionrelatively, the Reputational Risk index is indexed from 0, being no risk for zero incidents over the last two years at least, to 100 being the largest possible risk profile. Beyond the aforementioned three main event metrics (severity, reach and novelty) there is a secondary variable, unsharp. This variable captures the clarity of the incident dynamics and that of the company involvement in it, when coded as 0 the incident is sharply understood, when instead the value takes 1 the event is indeed unsharp. The value of RRI on Sharp incidents is on average 4 plus points higher than that of unsharp incidents, and these events occur 5 times more often than unsharp ones. Two sample t-test with equal and unequal variance show these differences to be statistically significant at least at a 1% level visible from Tables A.1.5 and A.1.6. The same t-test results happen for the Trend RRI betIen sharp and unsharp events. In the appendix there is a detailed quantitative analysis about how the index reacts to different event metrics for all events and events leading to the worst RRI level in the history of a company. Conversely, RRI appears to robustly react to events based on the different metric intensity (see Tables from A.5 to A.9).

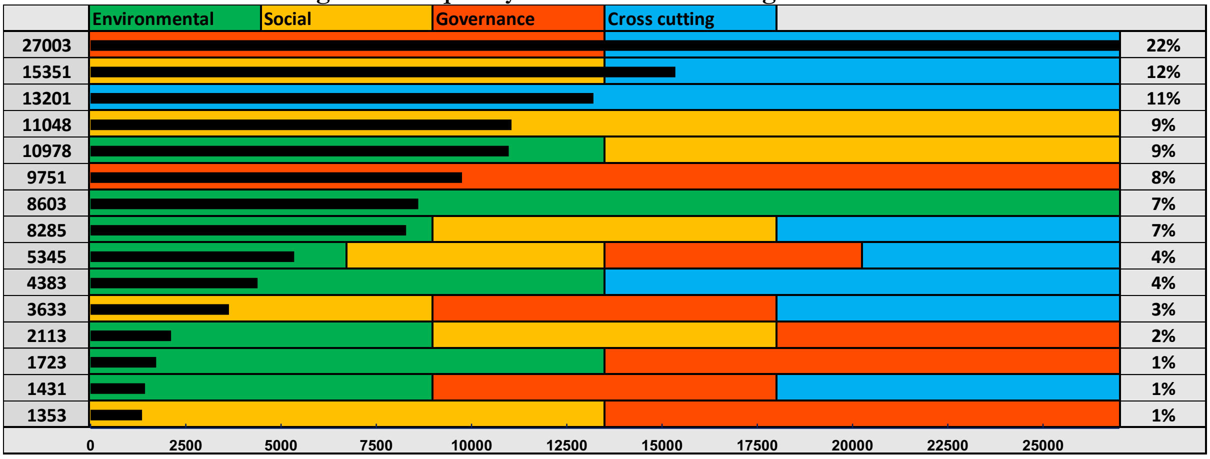
As our question of interest is to what extent are shareholders willing to take reputational risk, I describe the main characteristics of the incident based dataset first from a purely categorical perspective across evolutionally and cross-sectionally at a sectorial level for the ESG related controversies. Then I continue the description by looking at our quantitative metric of reputational risk, both in terms of changes and levels, leading the way to the empirical strategy.

In our analysis I have companies that Ire flagged at least once by RepRiskt pertaining to the MSCI North America and European Index (MSCI) which represent 85% of the float-adjusted market capitalizatipon of United States and Canada, and 80% for Europe. I have intially 1,893 North American and European firms and 124,201 incidents which is an uncommonly broad set of events for an event study. I match the firms of the dataset with Refinitiv Sectorial classification yielding a granular birdview of 29 sectors. Yet, as I am interested in only some dimensions and the data needs to satisfy the methodological specification our final dataset will represent a much smaller portion of the initial one as I will see in the continuation of the chapter.

Table A.1 presents the distribution of events associated to the one or multiple companies. The majority of events are connected to a smaller number of companies, with a single company being the sole entity associated to the controversy occurs in our sample 44,979 times, which represents approximately 68.3% of the total events. Two companies are associated with 10,251 events (15.6% of the total), while three companies are linked to 4,490 events (6.8% of the total), and so on.

Despite claiming mutually exclusive categorization of events, the large majority of incidents have components transcending just one facet of ESG. Figure 1 below shows that indeed the fourth component cross-cutting issues (see picture A.1 for the definition) is the most present both jointly and alone across the risk factors. Across 124,201 events in our dataset the majority pertains to Governance and cross-cutting issues, meaning controversies related to violations of legislations, standards and the law in general. Indeed, these types of illegal activities have serious repercussions in terms of legal costs and possibly fines and management trunover. Similarly, cross-cutting events stand second in association with social issues, implying that stakeholders are particular attentive to the effects of products, services and commercial practices on civil society. Interesting to note that 4% of events cross all 4 of these categories aiming at the wide range of stakeholders affected by controversies.

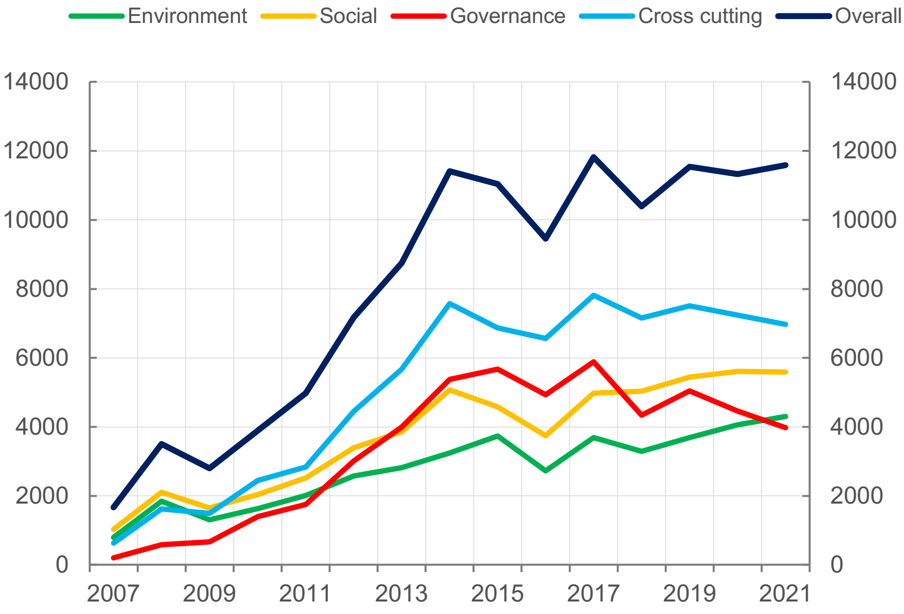
Figure 1: Frequency of ESG-C macro categorical events



Notes: In the first row there is the cromatic association betIen repective event categories. On the left-hand vertical axis, I have the number of events, while on the right-hand axis I have the respective percentage. The colors follow the macro categorical classification. The figure should be read as by looking at the black bars going across the x axis, which goes from 0 events to more than 2600 on the right-hand side. Each row represents a combination of events by the chromatic association. For instance, the top row is red and blue, meaning those are the events associated with governance and cross cutting incidents representing 22% of the total sample of events, 27003 events.

Again, by analyzing Figure 1 it is visible that issues that are sharply identified by one category alone account for a total of 35% of the full sample (11% cross sectional, 9% Social, 8% Governance, and 7% Environmental), thus there still is an extensive amount of clear-cut events. On the other hand Figure 2 shows the evolution over the last 15 years displaying a clear positive trend across all categories, and in the total number of events, pointing at an increase in the awareness of ESG risks by stakeholders to CSR issues.

Figure 2: Evolution over time of ESG-C macro categorical events

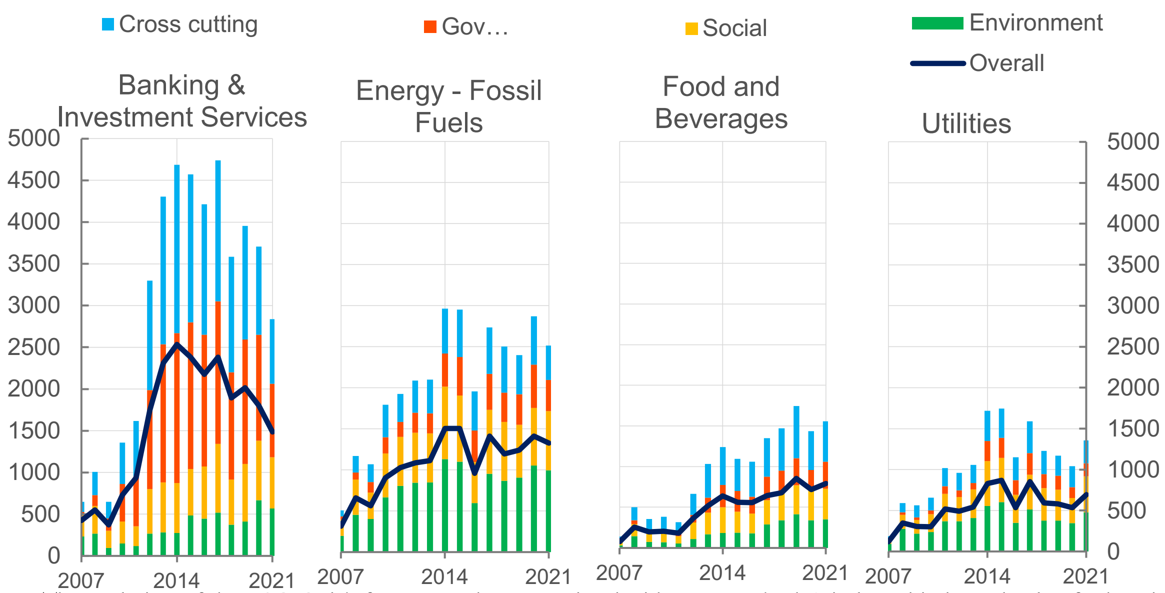


Notes: The evolution of the ESG-C risk factors spans the full sample of events independently of joint or independent events.

Ever since 2007, there appears to be an increasing scrutiny of ESG issues. The rise in the total number of controversies over time shows that cross-cutting and governance incidents seem to be integrated with the overall number of issues from 2007 to 2019. As the World shut down during the Covid Crisis, governance issues decreased as there was less economic activity. Similarly, the 3 inflection points in the years 2009, 2016, and 2018 are times of economic contraction, showing a correlation betIen the business cycle and governance related incidents. For the timeseries of environmentally related controversies a risee from 795 in 2007 to 3,243 in 2014 is visible, representing a 308% increase. Similarly, social issues experienced an even more significant surge, growing from 1,026 in 2007 to 5,075 in 2014, a 395% increase. Although the overall trend remains upward, there are periods of fluctuations betIen 2015 and 2021, stabilizing generally speaking at a median average of overall events betIen 12,000 and 10,000 a year.

Moving on to the sectoral analysis in relation to ESG events over time in our sample, the 4 largest constributors to incidents in our dataset are displayed in Figure 3, these being Banking, Fossil Fuels, Food and Beverages and Utilities. It is visible that there is substantial variation in the number and types of controversial events sectorally. For instance, the energy (fossil fuels) and utilities sectors have witnessed a higher number of environmental events, while the banking sector has experienced more social and governance events. Clearly, the nature of the commercial operations defines the relevant stakeholders and issues linked to specific sectors hinting at high pressure and regulation for specific ESG risks.

Figure 3: Sectorial development of ESG-C events over time

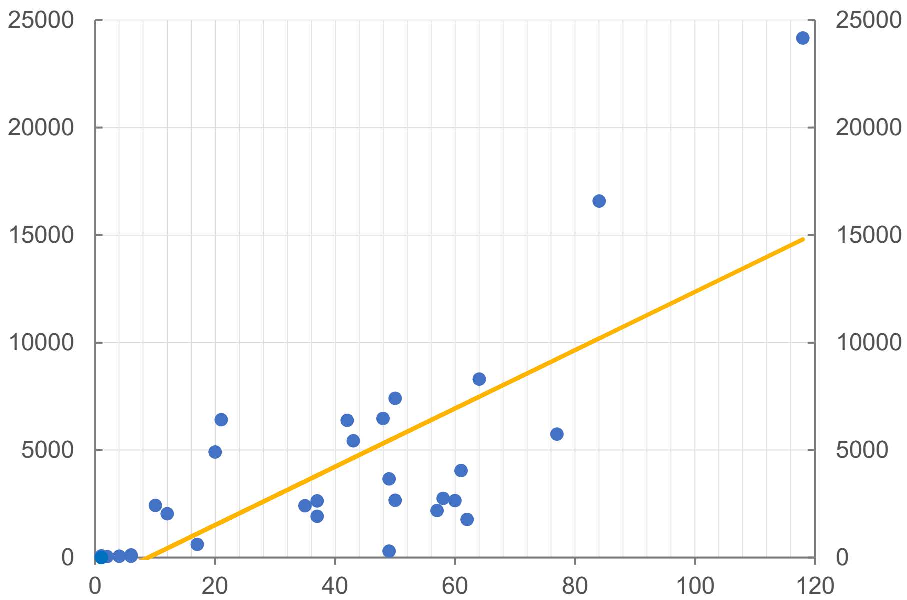


Notes: The evolution of the ESG-C risk factors are those associated with an event both jointly and independently of other risk factors spanning the full sample of events. Hence the overall number of events being below the max of each categorical cluster column.

The trend is generally positive betIen 2007 and 2014 in line with Figure 1, while the year 2014 represents the peak in number of incidents for Banking, energy and utilities. The growth of events in Banking is somewhat proportional across the different risk factors, hoIver governance and cross cutting seem to be the main growth drivers from 2011 onwards. Overall the figure shows a high degree of heterogeneity across the 4 largest contributors to our dataset.

From a cross-sectional perspective I need to understand if the over-exposure of the aforementioned sectors to ESG risks is driven by an over-representation of companies in our sample or if indeed these sectors are most irresponsible. In Figure 4 below one can observe a scatterplot betIen the number of controversies on the y-axis and number of firms in the sector on the x-axis . A clear positive relation is visible, of around 200 incidents per company and if I turn to the peaking order of contributors of incidents adjusted by the number of firms the Banking and Energy sectors are still at high risk, with 9354 and 6378 events in excess repectively. HoIver, Food & Beverages and Utilities in 7th and 8th place, while the Automobiles and Food Retailing have more incidents per firm. For a detailed view of the sectors with excess events given its size refer to Table A.2 in the Appendix.

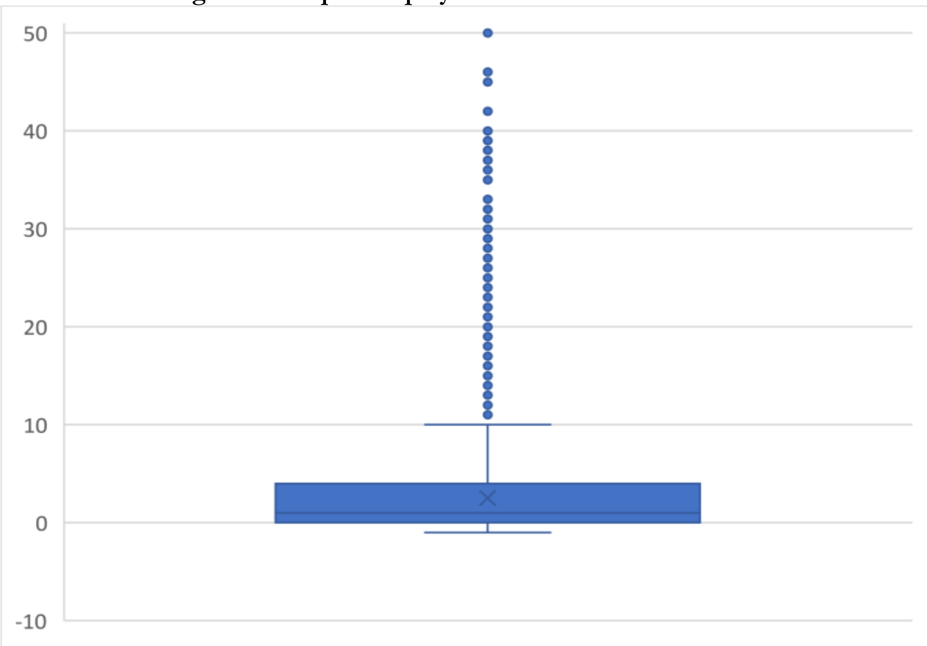
Figure 4: Scatterplot with linear fit of events and companies by sector



The figure presents the linear fit betIen number of controversial events (y-axis) and number of companies (x-axis).

It is essential to note that the number of companies in a sector may not necessarily correspond to the sector's economic Iight or influence. Larger sectors may comprise companies of varying sizes, while smaller sectors may consist of a few highly influential companies. In a similar manner, it may be that sectors or firms associated with plentiful ESG controversies may not be at high reputational risk as these events may have low reach or low severity. Hence, it is fundamental to describe the composition of the sample in relation to the gravity of the ESG incidents.

Figure 5: Boxplot display of the distribution of ΔRRI

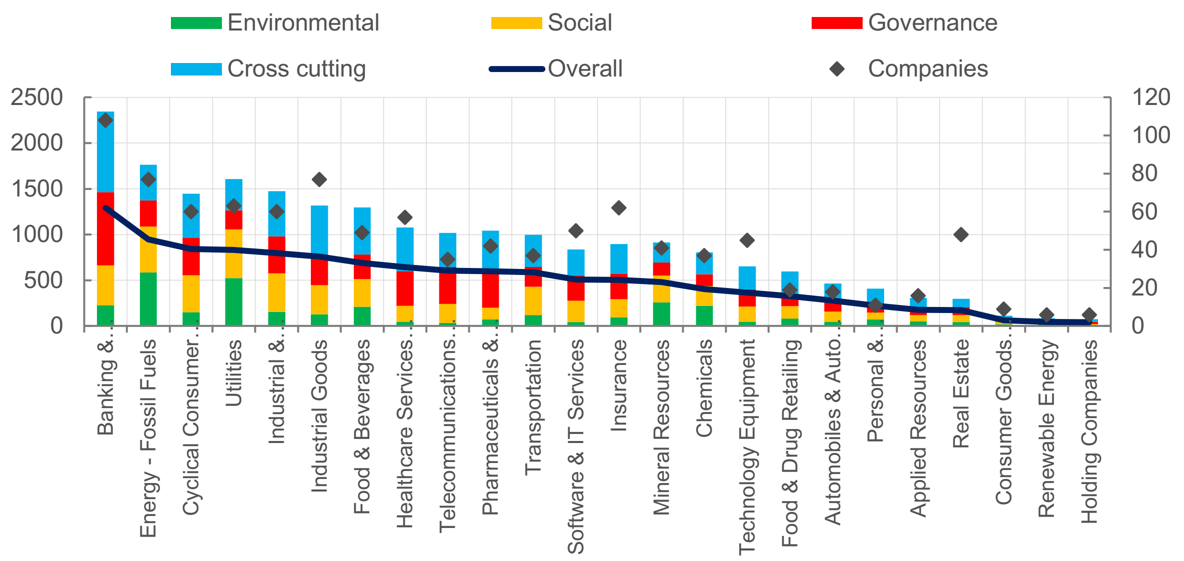


Notes: The 90th percentile is outside the rectangle, while the 95th is outside the horizontal line. Interesting to note that there are negative changes on the day of some event as the loIst bar is at -1. This has to do with the decaying factor across 2 year time horizon of RRI implying that some events are related to companies are completely irrelevant for the risk profile as the index moves down as if there Ire no controversies at all.

As the variable of interest to our model is the change in the reputational risk index (ΔRRI) on the day of an event, a quick examination of its distributional characteristic shows a large degree of skewness towards the left. Figure 5 shows that te 90 percent of changes in RRI can be found before a change of 5, while the 95th percentile of changes is from a change in 10 to 50. It follows, on the one hand, that the vast majority of events are not particularly impactful to the risk profile of a company as the event metrics show (see tables in the appendix for further information) as low severity incidents are not particularly detrimental to the reputation of a company. On the other hand, our main concern is about events that are informative about the degree of corporate social responsibility, or CSI for what matters, exerted to the point that it moves the index across reputational risk categories. Thus, in line with the literature I move our attention to the 95th percentile of RRI changes, those from 10 onwards, which yields a sample of events of more than 6200 observations, which is still unfashionably extensive for an event study.

Once I restrict out dataset to the most severe events, the sectoral composition of offenders does not change particularly as the number of severe incidents are fairly proportional to the picture painted before. Indeed like before, Banking and Energy are once again the biggest contributors with approximately 1300 and 1000 events respectively, while Cyclical consumer goods and Utilities follow with *circa* 800 events. Figure 6 below depicts the full cross-sectional panel of frims, total number of events and categorical composition by sector. What changes is the relation betIen number events per firms as it appears to have smaller mean error.

Figure 6: Events by sector in the 95th percentile of ΔRRI

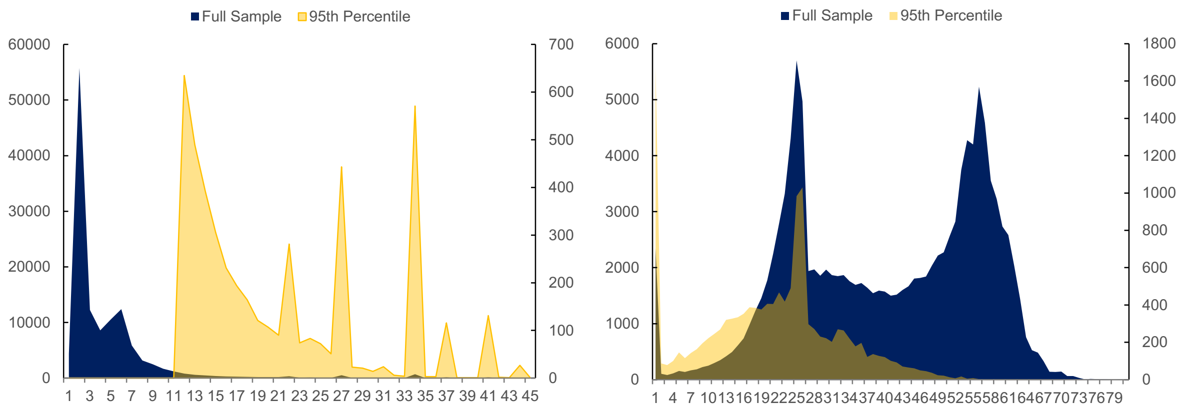


Notes: On the left vertical axis I have the number events per sector, in stacked colums the macrocategory and by line the respective total number of events by sector. On the right vertical axis I have the number of companies (the grey diamons) in our sample by sector.

The full sample of RRI at the time of an event is a bimodal distribution, visible in blue in the RHS chart of Figure 7, which displays the steady state reputational risk profile of the companies in our sample. The low risk profile has a mass around a RRI level of 25, which is the average level of RRI on non-event dates, and one with peak around 50 that is slightly above most severe peak RRI event averages (see Table A.5). The changes in RRI for the full sample have a peak around 1 and a second smaller peak around 6 as it can be noted in blue in the left chart below, hinting at virtually no changes in the profile of a company in most events or at a change of of one category in risk profile, as if it Ire from AAA to AA or from B to CCC. It is important to note that, in the full sample right hand side RRI distribution, betIen the two peaks there is a high frequency of around 2000 observations implying that plentiful of companies are betIen the average and high risk categories.

On the other hand, once I reduce our sample to the 95th percentile of ΔRRI, as one would expect the initial level of RepRisk Index shifts towards the left keeping two peaks, one in the far-left tail betIen 0 and 1, and one overlapping again the grand sample average at 25. This hints that in most cases for severe events, those in the 95th percentile of ΔRRI, companies either had a zero-risk or almost zero-risk profile which shifted towards the average profile of and around 25, or that it shifted from the average profile to the high risk second peak. In a similar manner, I ca notice 6 peaks of different sizes in the frequency of the 95th percentile of ΔRRI in yellow on the left-hand side, with most noticeably 550 events around 33, 450 around 36 and more than 100 at 42. Yet, the majority of events are betIen 10 and 20.

Figure 7: Distributions of frequencies ΔRRI(lhs) and RRI(rhs) on the day of controversies



Notes: In blue I have the full sample distribution of the changes in RRI on the left hand side figure and in the right hand side figure that of the RRI the day before the change on the right graph. In yellow I have the 95th percentile of the changes in RRI on the left hand side figure and in the right hand side figutr the attached distribution of RRI the day before the change on the right graph. The left y axes for both figueres shows the frequency for the full sample and the one on the right for the p-95th sample.

As I am interested in the market reaction to distinct severe events on different initial risk endowments, I dissect the RRI distribution (yellow in the RHS graph from Figure 7) in 4 multiple pieces: at zero, betIen 1 and 10, betIen 11 and 30, and betIen 31 and 69. The first risk profile that I analyze is the zero-peak against the rest of the distribution, which arguably approximates to gaussian with very high kurtosis. In a second instance I will look at the left-tail (excluding RRI=0), the central peak, and the right tail. The left tail of ex ante RRI is from 1 to 10 included, the center is from 11 to 30, and the right tail is from 31 to the maximum of 69. As there is a second peak at 31, the second breakpoint seems fairly logical. For the first one at 10 I have folloId Moody's methodology. With this approach, I am capable of assessing how the change from from one risk profiles to a worse one in an heterogenous manner is internalized by the market.

4. Methodology

One of the tenets in portfolio theory and asset pricing is that investors are mean-variance optimizers concerned only with risk and return for holding an asset (see Markowitz 1959, Sharpe 1964). Thus, rational investors will exceed in risk-taking only if they are satisfactorily compensated for it. The efficient market hypothesis (EMH) posits that security prices, such as stocks, fully integrate all accessible information (and expectations), resulting in a fair valuation of the security (Fama, 1965). This suggests that stock prices react to unexpected changes in information. To study the effect of ESG controversy on stock prices, I use an event study methodology, which in line with the EMH allows us to compare actual returns to the expected returns related to the part of the risk an investor can be compensated for, this being market risk. Thus, this methodology allows us to capture how new information about firm-specific reputability risk is processed to shareholder value in share prices.

An event study looks at the spread betIen actual and expected returns over an event window, this being the time-span around and after an event took place. As I am interested in testing the persistance of the impact on shareholder value from ESG-related incidents I am not concerned with share price reaction within a few days or Iek horizon, but rather I am interested as mentioned in multiple event windows spanning the short, medium and long term in line with the notion of sustainable investing. Therefore, I look at 12 event windows for each month starting with 1-month ahead of the event up to 12 months after the controversy.

To test our second hypothesis, I select events that lead to different changes in our reputational risk index across increasing percentiles of ΔRRI_t that imply a greater degree of severity. I select them for changes in the index on the day of the event that are greater or equal than 5, 10, 20, 30, or 40 if the sample size is large enough to satisfy the assumption of normality for executing frequentist econometric testing.

Given that hypothesis 3 on the defining nature that the intial reputational risk profile has on shareholder return could be disentangled into two sub-hypotheses, one about perfect CSR score and one concerning a progressively worsening of imperfect CSR score, I test them by comparing two sets of mutually exclusive risk profiles. On the one hand, for hypothesis 3.a, concerning clean versus dirty firms, I select events of firms that have an RRI_{t-1} equal to zero for clean company profile and non-zero for dirty companies. These two mutually exclusive groups are then tested for varying changes in RRI in line with hypothesis 2. On the other hand, to test hypothesis 3.b, I part the distribution of firms-events by three *ex ante* non-zero risk profiles, these being: low reputational risk firms which have an initial RRI betIen 1 and 10 included; average risk which have an original RRI betIen 11 and 30 included; and finally high risk firms with an RRI greater than 30. This decomposition is in line with the distributional characteristics observed in Figure 7. I look at CSI incidents that have an impact on the index greater than 5, 10, 20, 30, 40 to jointly test the second hypothesis. I include in this event selection process also the ΔRRI pertaining to the 90[th] percentile, as I might not have enough observations for higher percentiles to have a consistent comparative set of results given the sample size of the cases.

Finally, to test the 4[th] hypothesis about the value relevance of environmental risk on shareholder value I select all sharply identified Environmental, Social and Governance related incidents for a ΔRRI pertaining to the 95[th] in a mutually exclusive fashion. Because the first three hypothesis capture multidimensional facets of the same phenomena, the testing approach is joint meaning that I test all 3 hypothesis every time I calculate abnormal returns and the attached t statistics. Below in Table 0, one can observe the methodological framework.

Table 0: Research Design

Hypothesis		Event Window	RRI_{t-1}	ΔRRI_t
1		[1,12]		
2		[1,12]		$\Delta RRI_t >$[5; 10; 20; 30; 40]
3				
	3.a	[1,12]	[RRI_{t-1} =0; RRI_{t-1}>0]	$\Delta RRI_t >$[10; 20; 30; 40]
	3.b	[1,12]	[0 < RRI_{t-1}<10; 10<RRI_{t-1}<30; RRI_{t-1}>30]	$\Delta RRI_t >$[5; 10; 20; 30; 40]
4		[1,12]	All	$\Delta RRI_t >$10

Note: Event window expressed in months after the event; RRI_{t-1} is the RepRisk index one day before the event took place

Since I have defined the event windows of interest, the relevant categories of firms and the important events to ansIr our research question I can move on to the formal specifications of the model used to measure abnormal returns.

The spread betIen the realized return R_{it} and the expected return $E(R_{it})$ yields the abnormal return AR_{it}. The realized return is calculated as

$$\boldsymbol{R_{it} = \frac{P_{i,t}}{P_{i,t-1}} - 1} \quad \textbf{(1)}$$

where $P_{i,t}$ is the closing price for company *i* at time *t* and $P_{i,t-1}$is the closing price for the same company at time *t-1* with daily frequency. *T*he expected return on the other hand is a function of a factor model gauging systematic risk factors (Bos et al., 1984) In this empirical exercise, I use the market model to estimate the "beta" relation betIen market return risk factor and the asset of interest. The most important aspect is that the expectations are always consistent with the same model. I opt for the market model as the market factor is consistently the major determinant for systematic risk. Thus, the expected returns are constructed as

$$\boldsymbol{E(R_{it}) = \alpha_{i,0} + \beta_i MKT_t + \varepsilon_{i,t}} \tag{2}$$

where $E(R_{it})$ is the expected return, MKT_t is the return on the respective market portfolio (North American and European) and $\varepsilon_{i,t}$ the error term with expected mean of 0. In accordance with the literature I use an estimation window to estimate our market beta coefficient that does not overlap with our event window. As there may be information leakage (Binder, 1998) where news about the controversy spillover on the market before the event took place, I leave a gap betIen our estimation window and our event window of one month. I use an estimation window of -390 days up to -30 days before the event took place. Our event window on the other hand starts 2 days before the event took place up to t+1. Data is dropped for companies that do not have observation within the estimation window and/or the event window interval yielding in practice aa analysis of events from February 2009 up to April 2021. The specification of the market model estimation is OLS regression. The β_i is the sensitivity of the company stock *i* to the market factor:

$$\boldsymbol{AR_{it} = R_{i,t} - (\alpha_{i,0} + \beta_i MKT_t)} \tag{3}$$

Lastly AR_{it} is our abnormal return at time *t* as previously mentioned, which is then cumulated over the event window this being a sequence of windows starting 2 days before the event up to 12 months after discretely on a monthly frequency. Equation 4 describes the cumulative transformation being:

$$\boldsymbol{CAR_i(t_1, t_n) = \sum_{t=t_1}^{t_n} AR_{i,t}} \tag{4}$$

where n=[1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12] in the notation from here onwards, but as I use daily events and daily returns I approximate one month by 30 days, meaning that the effective n is [30; 60; 90; …; 360]. Because I am using a dataset comprised of week-ends and bank-holidays to not miss relevant informatio, and daily prices on non-trading days have been carry-forward from the last availabe day such an approximation fair.

The last step of the event study is to compute the cumulative average abnormal returns, specified as follows

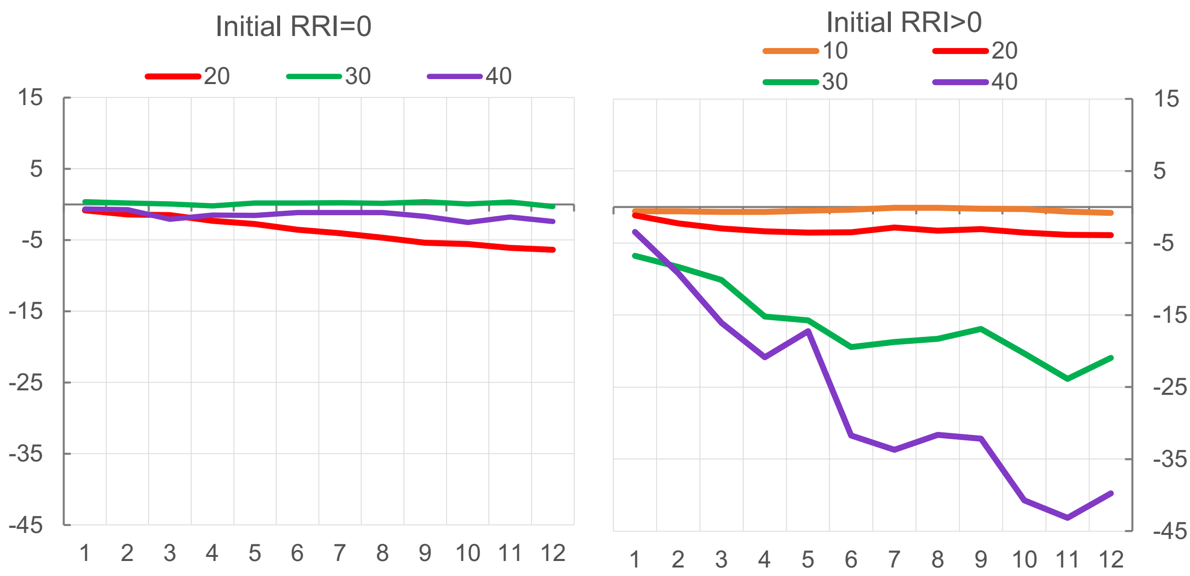
$$\boldsymbol{CAAR(t_1, t_n) = \frac{1}{N}\sum_{i=1}^{N} CAR_i(t_1, t_n)} \qquad \textbf{(5)}$$

where the average is over the different samples detailed in Table 0. To test for the significance of our cumulative average abnormal returns I use a t-test in which the standard errors used have been constructed from the estimation of returns. The CAARs computed across the different samples, as aforementioned, are evaluated in terms of magnitude and trend for all estimated cases, but the last word is clearly on the significance of the t-test.

5. Results

The following chapter provides the results of the various analyses, starting with the results from the event studies for the distinct cases of *ex ante* "clean" CSR profile *vesrsus ex ante* "dirty" CSR profile. This is folloId by the results for the 3 non-zero *ex ante* risk profiles (low, average, high). Finally, I report the results for the event studies of sharply identified ESG-related incidents and those of environmentally exposed sectors.

Figure 8: CAAR for RRI over event horizon



Note: Both statistically significant and insignificant results are plotted independently of the number of observations in the sample. In orange ΔRRI>10, in red ΔRRI>20, in green ΔRRI>30, in purple ΔRRI>40.

In Figure 8, by visual inspection one can observe the persistent nature of abnormal returns from one month up to one year after the incident took place. Similarly, in the right-hand chart the magnitude of negative returns increases progressively in line with the increase in ΔRRI. For a ΔRRI of 10 or more, negative returns are in the range of 0.28% and 0.1%, while for a ΔRRI of 20 or more, the range is betIen -1.176% and -3.908% for one month and one year after the event respectively. The persistency and the worsening of negative CAARs seems to hold for even more drastic event, with a far greater spread in returns from ΔRRI>30 compared to a ΔRRI>20 while the same holds true for ΔRRI>40 compared to a ΔRRI>30. For the results in the left chart for of an endowment of RRI=0, the relation of severity holds only across a ΔRRI greater than 30 and 40, while a change greater than 20 appears to be far larger after the third month window. These results, appear to support our first three hypotheses as: the negative abnormal returns are persistently below zero for all cases except for the RRI=0 ΔRRI>30 case, which is hoIver close to 0. Similarly, the returns for the *ex ante* RRI>0 worsen in magnitude not only over time but as Ill with the severity of the incident; and finally the difference across the two panels shows that a history of controversies is attached to worse and more persistent negative returns. Yet, only the t-test can tell if I can reject or fail to reject these hypotheses.

In Panel A of Table 1 I can observe the cumulative average abnormal returns for companies that had no reputational risk ex ante of the incident news. If there was no perceived reputational risk before the incident took place, it appears that the incident does not affect the shareholder value significantly and independently of the event window or the severity of the event. Factually, the relation betIen less severe and more severe events does not appear to hold as for most of the different months ahead of the event a change in the index that is greater or equal than 20 yields greater negative returns compared to those of a change in RRI of 40 or more. Conversely, when the delta changes of 20 or more or in the case of a change of 40 or more the negative abnormal returns and the size of these increases monotonically for the former and it increases around a moving average for the latter. On a different note, the CAAR of the change in RRI of 30 is in essence positive and close to 0. The large number of observation for all three of the examined cases suggests that I cannot reject *hypothesis 3.a,* implying that if a company CSI record is clean then the market will be accomodating over both the short and long term horizon.

Table 1: CAAR for clean reputational profile and dirty profile across event horizon

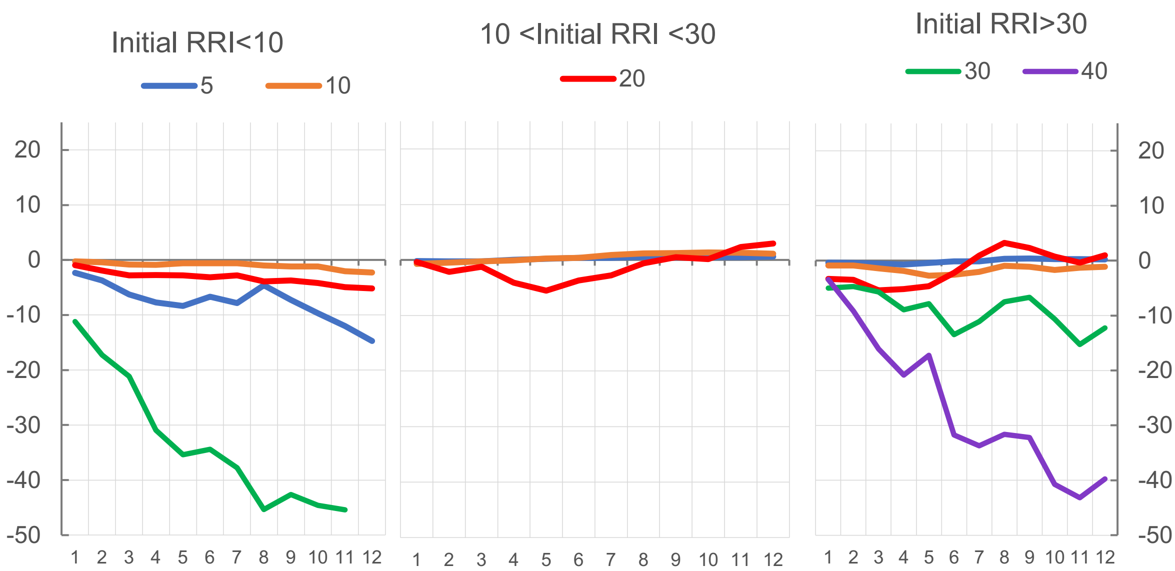
	Panel A			Panel B		
RRI		**equal to 0**			**greater than 0**	
ΔRRI	**20**	**30**	**40**	**10**	**20**	**30**
1	-0.817 (-0.89)	0.37 (0.694)	-0.642 (-0.756)	-0.598*** (-2.976)	-1.176** (-2.082)	-6.757*** (-3.41)
2	-1.398 (-0.87)	0.19 (0.303)	-0.734 (-0.675)	-0.586** (-2.152)	-2.251*** (-2.71)	-8.301** (-2.659)
3	-1.513 (-0.913)	0.047 (0.06)	-2.072 (-1.28)	-0.678** (-1.98)	-2.978*** (-3.053)	-10.116** (-2.497)
4	-2.294 (-1.001)	-0.225 (-0.244)	-1.518 (-0.74)	-0.659* (-1.667)	-3.37*** (-2.722)	-15.213** (-2.44)
5	-2.761 (-0.906)	0.196 (0.184)	-1.532 (-0.628)	-0.494 (-1.084)	-3.566** (-2.537)	-15.725** (-2.545)
6	-3.549 (-0.931)	0.198 (0.17)	-1.166 (-0.444)	-0.382 (-0.754)	-3.501** (-2.219)	-19.447** (-2.897)
7	-4.025 (-0.899)	0.256 (0.198)	-1.162 (-0.43)	-0.101 (-0.178)	-2.847* (-1.616)	-18.743** (-2.498)
8	-4.693 (-0.904)	0.155 (0.11)	-1.13 (-0.376)	-0.111 (-0.18)	-3.286* (-1.64)	-18.309 (-1.688)
9	-5.394 (-0.902)	0.384 (0.261)	-1.699 (-0.521)	-0.247 (-0.37)	-3.081 (-1.459)	-16.943 (-1.565)
10	-5.573 (-0.933)	0.04 (0.025)	-2.519 (-0.703)	-0.279 (-0.392)	-3.556 (-1.571)	-20.35* (-1.928)
11	-6.119 (-0.952)	0.315 (0.183)	-1.766 (-0.484)	-0.656 (-0.849)	-3.843 (-1.59)	-23.877* (-2.043)
12	-6.372 (-0.989)	-0.303 (-0.166)	-2.382 (-0.652)	-0.812 (-0.981)	-3.908 (-1.484)	-20.945* (-1.773)
N	**1650**	**858**	**162**	**2741**	**285**	**14**

Note: t statistics in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; CAAR expressed as percentages and constructed with the market model. The numbers in the first column refer to the event window expressed in months ahead of the event approximated as 30 days after the event (Iekends and bankholidays included).

While there are no significant returns in the event horizon for riskless companies, on the other hand the picture painted by the Cumulative Average Abnormal Returns in Panel B completely differs from Panel A. Returns are negative and significant at least at a 10% level over the medium term, for the first 4 months for a change of 10-plus in RRI and even up to 8 months for a delta of 20, and over the long term significant at least at a 5% level for all across the long-horizon besides the 8th and 9th month. The relation across changes in reputational risk treshold, from a relatively small one to a larger one, seems to hold indicating that shareholders are increasingly sensitive to more severe incidents across the short and medium term. Lastly, within a 12-month event window, the CAAR is, -20.945% (10% significance) for a ΔRRI of 30, and -39.762% (10% significance) for a ΔRRI of 40 aiming at a very detrimental impact on shareholder Ialth. Yet, the number of observation is only of 14 and 3 for changes in 30 and 40 implying that I cannot draw any conclusion due to such a small sample selection. HoIver, the sample size of the first two columns of panel B is reassuring in terms of statistical rigor given the large number of events tested (2741 and 285 respectively). Thus, so far I have not been able to reject our first three hypotheses once again.

Moving on to the results to test hypothesis 3.b, by decomposing the the ex ante level of reputational risk for non-zero values, hence the right hand side chart from Figure 8, in Figure 9 I can observe the cumulative average abnormal returns for the 3 distinct ESG risk profiles (low, average, high). As mentioned in the methodology, the cases of severity here are five as I have tested for the 90th percentile of ΔRRI (a delta RRI greater than 5). What is striking at first sight from the three panel figure below is the different composition of returns of the middle chart, the one for average ex ante risk profile, compared to the other two. Surprisingly, even events for the zero-risk category from above have worse returns than those of the average risk profile. Thus, this chart gives the impression that shareholders are not sensitive when their company is at the average market level of reputational risk.

Figure 9: CAAR for low, average and high profile over event horizon



Note: Both statistically significant and insignificant results are plotted independently of the number of observations in the sample.

For low risk profiles, the non-zero RRI<10, the relation betIen different degrees of severity attached to ESG incidents seems to hold for changes of 10, 20 and 30. Similarly, the same holds true for changes from 5 to those of 40 for the firms with initial high risk profile, or at least that is the case in the first 5-month event window up until the abnormal returns for ΔRRI>20 inverts its direction bevoming positive. A similar pattern for this particular change in the RepRisk index is found for the average profile which is negative in the first 8 months below the CAARs of 5 and 10 up until it becomes positive in the 9^{th} month. Therefore, the visual evidence for hypotheses 1 and 2 is mixed being this contingent on the intial level of risk.

Another interesting result is the insignificance of the 90^{th} percentile ΔRRI across all event windows and risk profile besides in the 4^{th} month horizon for high risk profile of a magnitude of -0.713%. The results for the first three month windows of the same case are negative and monotonically increase, insignificant at the 10% level but with t-statistics close to the -1.65 treshold (-1.5 for month 1, -1.3 for month 2, and -1.5 for month 3) meaning that for companies with a high reputational risk profile even a small adverse event might be impactful in the short-run.

Moving on to the statistical significance of our abnormal returns, in Panel A, stock returns of firms that have low *ex ante* CSI profile appear to be sensitive only to relatively high changes in RRI, those in the 90^{th} percentile and above, both in the short and in the long run. In fact, caar for event windows of 3-months, 11-months and 12-months are significant at least at a 10 percent significance level with negative returns of magnitude 0.853%, 2.019 and 2.284 respectively for the 90^{th} percentile change. For events with ΔRRI>20, there are persistent and significant negative returns up to one year. Yet, the first month is insignificant at the 10% level, while it becomes significant in the second up to the 6^{th}-month horizon, only to once again turn significant only in the last two months. If after one month the return is of -0.946%, this increase in magnitude progressively to 5.191% loss in shareholder value after one year. The large sample size of 229 observations for this category of events and firms suggest that I can rely on the significance of results which supposrts our 1^{st} and second hypothesis.

Panel B, displays CAAR insignificantly different from 0 for all changes in RRI greater than 5 and greater than 20. There is hoIver a short term significant negative return of 0.69% for the first month post event with an RRI delta greater than 10. It seems that relatively small changes in RRI paired with an ex ante level of reputational risk that is "average" is not reflected in the market. The wide heterogeneity that can be found with such a large sample size, that of 7752, may explain this lack of significance in persistency.

Table 2: CAAR for low, average and high profile companies across event horizon

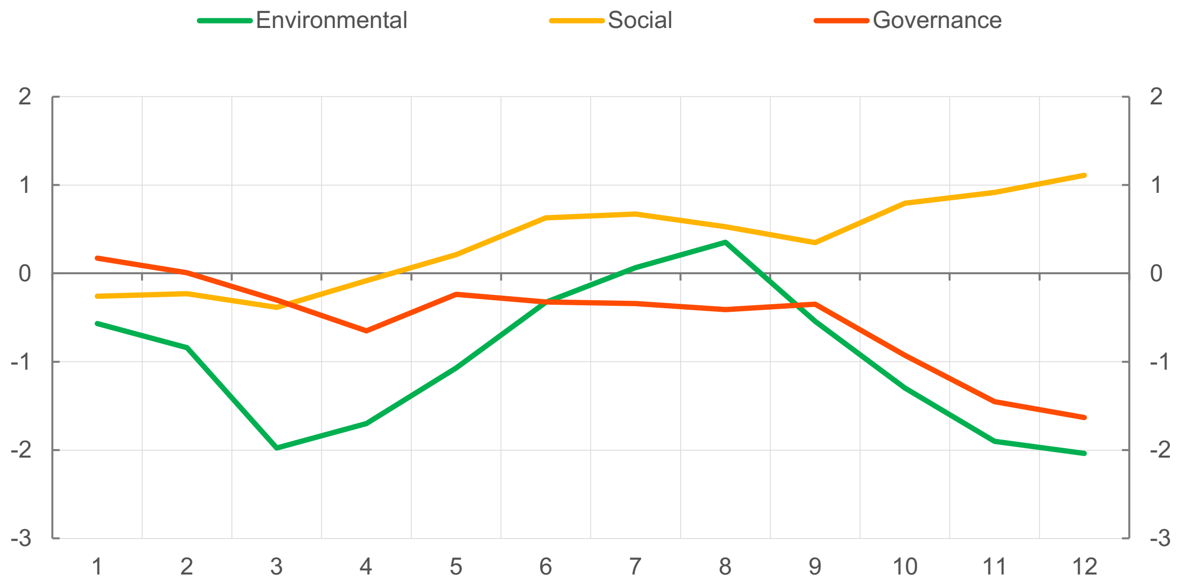
	Panel A			Panel B			Panel C		
RRI	**smaller than 10**			**betIen 10 and 30**			**larger than 30**		
ΔRRI >	**5**	**10**	**20**	**5**	**10**	**20**	**5**	**10**	**20**
1	-2.346	-0.226	-0.946	-0.188	-0.693**	-0.368	-0.361	-0.877*	-3.316*
	(-1.052)	(-0.778)	(-1.48)	(- 1.59)	(-2.427)	(-0.233)	(-1.49)	(-1.647)	(-1.92)
2	-3.747	-0.429	-1.941**	-0.233	-0.49	-2.153	-0.4	-0.872	-3.496*
	(-1.071)	(-1.04)	(-1.977)	(-1.43)	(-1.326)	(-1.161)	(-1.27)	(-1.227)	(-1.87)
3	-6.249	-0.853*	-2.799**	-0.22	-0.231	-1.221	-0.556	-1.403	-5.441*
	(-1.13)	(-1.648)	(-2.486)	(-1.08)	(-0.495)	(-0.503)	(-1.48)	(-1.61)	(-1.86)
4	-7.705	-0.912	-2.718*	0.067	-0.071	-4.061	-0.713*	-1.888*	-5.192
	(-1.13)	(-1.505)	(-1.94)	(0.283)	(-0.134)	(-1.216)	(-1.71)	(-1.841)	(-1.23)
5	-8.348	-0.622	-2.771*	0.199	0.283	-5.522	-0.429	-2.764**	-4.677
	(-1.097)	(-0.894)	(-1.696)	(0.737)	(0.455)	(-1.52)	(0.905)	(-2.424)	(-1.03)
6	-6.685	-0.584	-3.165*	0.387	0.39	-3.696	-0.132	-2.55*	-2.242
	(-1.117)	(-0.755)	(-1.707)	(1.273)	(0.566)	(-1.221)	(0.247)	(-1.941)	(0.419)
7	-7.803	-0.619	-2.79	0.398	0.94	-2.786	-0.15	-2.06	0.89
	(-1.103)	(-0.71)	(-1.343)	(1.182)	(1.212)	(-0.868)	(0.254)	(-1.442)	(0.154)
8	-4.572	-1.014	-3.871	0.579	1.179	-0.596	0.328	-0.966	3.233
	(-1.305)	(-1.062)	(-1.636)	(1.58)	(1.407)	(-0.162)	(0.538)	(-0.637)	(0.539)
9	-7.229	-1.185	-3.723	0.446	1.247	0.517	0.407	-1.102	2.314
	(-1.234)	(-1.165)	(-1.516)	(1.093)	(1.358)	(0.107)	(0.632)	(-0.715)	(0.389)
10	-9.677	-1.164	-4.161	0.501	1.351	0.166	0.253	-1.721	0.742
	(-1.175)	(-1.064)	(-1.603)	(1.146)	(1.394)	(0.03)	(0.37)	(-1.001)	(0.106)
11	-11.978	-2.019*	-4.932*	0.51	1.294	2.359	0.26	-1.276	-0.367
	(-1.237)	(-1.7)	(-1.802)	(1.074)	(1.228)	(0.391)	(0.358)	(-0.685)	(0.045)
12	-14.716	-2.284*	-5.191*	0.605	1.15	2.971	0.206	-1.106	0.95
	(-1.207)	(-1.788)	(-1.742)	(1.193)	(1.021)	(0.444)	(0.271)	(-0.57)	(0.111)
N	**1473**	**1247**	**229**	**7752**	**1436**	**38**	**2531**	**330**	**22**

Note: *t* statistics in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; CAAR expressed as percentages and constructed with the market model. The numbers in the first column refer to the event window expressed in months ahead of the event.

If Figure 9 gave us the impression of worst returns for high risk companies as the severity of the incidents increases, Panel C in Table 2 shows only a sample size large enough for ΔRRI>5 and ΔRRI>10. The results for a change greater than 20 have only 22 observations, while those for 30 and 40 have just 10 and 3 respectively, hence they are disregarded as the assumption of normality cannot be satisfied meaning that the caar t-test cannot be computed in an informative way. Hence, the form and shape of the returns over windows and severity scores resembles much more that of Panel B. Indeed, here too I have small insignificant returns for ΔRRI>5 but I have comperatiely large and significant returns for events of ΔRRI>10 over the medium term up to 6-months post event. Returns are significant at the 10% level for 1^{st}, 4^{th} and 6^{th} months respectively with impact on shareholdervalue of -0.877%, -1.888 and -2.55%, while for the 5^{th} month significance is at least at the 5% level with magnitude of -2.764%. These results provide evidence to reject hypothesis 3.b, meaning that as the risk profile of a firm worsens shareholder value does not deteriorate with it. Actually, the results suggest that the greatest loss in shareholder value is attached to firms that have a below average history of CSI.

The results concerning hypothesis 4 about specific ESG risk factors follow below in Figure 10 and in Table 3. From a visual inspection of the figure, it is visible how negative abnormal returns for environmental incidents are larger in magnitude both in the short and long run compared to those of Social and Governance related incidents. HoIver, betIen the 7th and 8th month horizon they turn positive. On the other hand, the trend over time of CAAR for social and governance events do not have major inflection points, with returns for governance related incidents being positive in the the short run and progressively becoming largely negative. The opposite holds true for social related incidents, which are linked to negative abnormal returns in the shorth run and progressively become more positive.

Figure 10: Cumulative Average Abnormal Returns for ESG over event horizon



Note: Lines plotted independently of statistical significance of cumulative returns.

Moving on to the statistical tests, the results presented in Table 3 show that cumulative average abnormal returns of environmental incidents are the sole significant coefficients across the 3 ESG categories. In the short-run after an environmental incident, stock abnormal returns drop significatevely and negatively in the magnitude of 57 percentage points, 0.84 percent, 1.975% and 1.7% up until 4 months respectively (with significance level at least at 10%, 5%, 1% and 5% respectively). On the other hand, socially related controversies could be associated with negative abnormal returns with the same persistence until the 4th month after the event, hoIver these, like all other returns for this category, are statistically insignificant within the 10% level. Social issues have insignificant CAAR across all 12 windows, hoIver the abnormal returns are negative in the magnitude of -0.385 percent and -0.083% for the first 4 months before turning positive. The nature of social issues in a social media world might explain the short run impact on returns for social controversies being this linked to fast moving negative publicity.

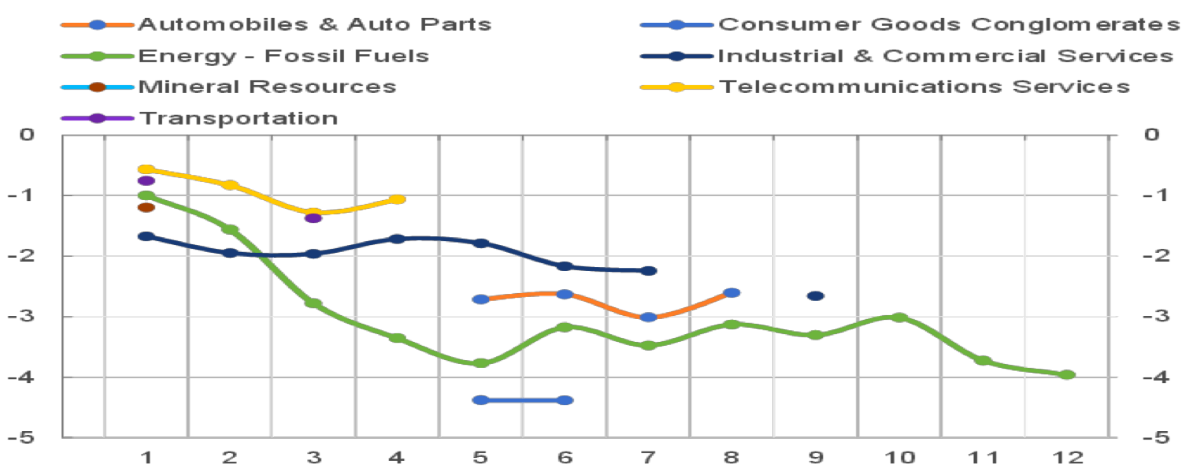
Table 3: Cumulative Average Abnormal Returns for ESG events

	Environmental	Social	Governance
1	-0.569* (-1.651)	-0.257 (-0.936)	0.172 (0.479)
2	-0.841** (-2.097)	-0.23 (-0.605)	0.006 (0.013)
3	-1.975*** (-2.776)	-0.385 (-0.829)	-0.302 (-0.577)
4	-1.7** (-2.047)	-0.083 (-0.153)	-0.649 (-1.121)
5	-1.07 (-1.115)	0.211 (0.333)	-0.239 (-0.362)
6	-0.325 (-0.309)	0.629 (0.871)	-0.323 (-0.432)
7	0.066 (0.056)	0.67 (0.849)	-0.341 (-0.404)
8	0.352 (0.266)	0.527 (0.608)	-0.411 (-0.463)
9	-0.541 (-0.378)	0.349 (0.369)	-0.35 (-0.362)
10	-1.298 (-0.847)	0.794 (0.785)	-0.927 (-0.894)
11	-1.902 (-1.123)	0.915 (0.832)	-1.453 (-1.258)
12	-2.039 (-1.116)	1.111 (0.912)	-1.633 (-1.331)
N	**702**	**1368**	**1604**

Note: *t* statistics in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; CAAR expressed as percentages and constructed with the market model. The numbers in the first column refer to the event window expressed in months ahead of the event.

Conversely, governance related events are statistically insignificant and negative from the second month onwards. As this category of controversies materialize in the long run, a possible explenation could be that potentially it takes investors more time to fully process and react to governance issues or for regulatory actions to unfold. Yet, no conclusions can be derived as the results are statistically insignificant. The results support our fourth hypothesis of environmental risks being of value to shareholders despite the initial risk profile.

Figure 11: Significant Negative Cumulative Average Abnormal Returns by Sector



Note: Only statistically significant results are plotted for sectors with enough observations in the underlying sample.

Evidence of significant negative returns from the sectoral analysis visible in Figure 11 shows mixed results in terms of persistency for Automotive, Transportation, Consumer Goods and Mineral sectors, but it displays signs of persistency in the short run for Telecommunication services, in the medium run for Industrial Services, and in the long run for Energy sector in the fossil fuel business. Tables A.11 to A.14 show the coefficients of all 24 sectors srawing once again a very heterogenous picture of results. HoIver, the abnormal returns for Fossil Fuel sector are all significant at least at a 5% level and at least at the 1% level for the event window of 2-months up to 7-months. As I can see, shareholders would lose 1% of value after one month from an incident and progressively lose more up to 4% after one year. Once again, I fail to reject our fourth hypthesis at least in relation to the most environmentally exposed sector of the dataset.

6. Discussion

By means of event study across different clustering of ESG incidents, risk profiles and groups of offenders, I have observed a high degree of heterogeneity in the shareholder value reaction hinting at a value relevance of both RepRisk datset and of CSR at large. Persistency of returns over the one-year horizon appear to exist, and these are contingent on the severity of the events, hence I fail to reject our first hypothesis. Similarly, I fail to reject the second hypothesis, as the results suggests that companies facing more severe ESG controversies may experience a more pronounced decline in stock price performance in the 1 to 12 months ahead of the event. HoIver, the degree of loss in shareholder value as incident severity aggravates is mostly contingent on the initial reputational risk profile of the company, with clean companies being immune to controversies, and companies with a low level of risk being the most affected.

The reaction for companies with average and high levels of risk is mixed as I have significant negative returns only in the mid-term but neither in the short or long run. Hence, I seem to fail to reject hypothesis 3 as the shareholders react only in heterogeneous manner to ESG controversies. HoIver, the initial risk profile seems relevant across all dimensions only if a company has a moderate history of CSI, while an average profile does not matter as much.

A possible explenation for the average risk profile insignificant and small magnitude of the results is that the relatively small changes in RRI might conceal a sample selection bias. As I can see from the majority of the observations being for changes of 5 and 10, then within a risk profile that is betIen the interval of RRI 10 and 30, events of this severity do not change the risk profile from average to high. Actually, if I go back to Figure 7, I can observe very high density in the distribution of initial RRI for the 95th percentile of changes (ΔRRI>10) betIen 10 and 25. Changes of 5 in reputational risk will keep the company in the same risk cluster and the same holds true for changes of 10. On the contrary, for changes greater than 20, which would yield a change in risk profile for all entities within the treshold, CAARs are negative up until the 8th month but statistically insignificant. A change of this magnitude or greater, points towards the same conclusion: if the risk profile does not change investors are not supceptive to controversies. In a similar manner, I have observed that shareholders react more prominently and persistently to changes in the reputation of a company from this being almost completely responsible to it becoming irresponsible. Once a firm CSR reputation is damaged beyond a specific treshold, that being within average or beyond average, then shareholders are affected only in the short term and without extensive magnitude. This suggests that indeed CSR matters in the context of shareholder value theory, specifically if framed within the context of reputatability.

Moreover, if the risk profile seem to matter to shareholders, just like the severity of incidents does too, the results for the ESG categorical event selection point towards a high value relevance to environmental issues excluding risk profile. Thus the evidence is mixed in terms of risk profile. The sectorial results show hoeIver a very high positive abnormal returns in financial industry, while consistent negative returns for the energy sector. All in all, it might be the case that the environmental sphere because of explicit constraints is the driver of all these results. These results cannot be taken at face value as I have faced many limitations in the empirical approach.

The first limitation is that the estimation of the post-event window and the estimation window may be biased by confounding factors, some of which may be endogenous to the RepRisk dataset. In fact, it is likely that before a severe event takes place other related events might have occurred. The same may hold true for other related events occurring after the one analysed took place. Hence, as I am testing over the long run, I need a minimum of 25 months around one event (13 months before for estimating the beta coefficient and one after for the abnormal returns), which yield a high degree of overlapping confounding factors. A solution could be to restrict the dataset to only relevant events, which is what I did to a certain extent, but to do so I would need to know what events are relevant. This situation is a clear example of joint-hypothesis bias (Fama, 1991). In the future, it would be interesting to analyse the sequential relation betIen ESG related incidents to assess if small one are predictors of large ones and how the market reacts in the short run for news related to the same incidents.

The second limitation of the study concerns the far too restricted sample of very extreme events. As I have seen from the figures in the results section, changes greater than 30 or 40 are associated with negative abnormal returns in the magnitude of 20 to 40 percent in the long run, hoIver the limited amount of observation prevents us to estimate the statistical significance of these return patterns. Another limitation from our methodology is that I have not accounted for other factors other than the market return in constructing the expected returns. Part of the abnormal returns could be explained by confounding factors idiosyncratic to the firm, such as momentum or size, hence our abnormal returns could suffer from upward bias in terms of magnitude. It would be interesting to use a different asset pricing models (3-factors; carhart; …) to test the robustness of the coefficients.

Our final limitation, in hindsight, concerns the exclusion of merged and acquired companies from our sample which leads to a high risk of sample selection bias. It is likely that after a severe CSR incident occurs shareholders will force management out to cleanse the reputation of the company. In this case a merger might be beneficial as there is already the need for a new managerial culture. Similarly, if the share price has fallen following a controversy, but book value staied the same, the firm linked to the incident might become an attractive target (e.g. Activision Blizzard). Through this line of reasoning it is likely that I have excluded companies whose stakeholder value was directly impacted by CSI incidents. Yet, an acquisition not controlled for will be a strong confounding factor in the abnormal returns, hence to solve this issue one would need to merge incident data with M&A history. Likewise, companies that Int bankrupt might have done so because of very bad CSR score hinting at a possible downside bias for negative abnormal returns in the magnitude of the coefficients as I have excluded the most impacted observations from CSI incidents. Therefore, future research could test if ESG controversies are predictors of acquisitions, as I have seen that CSR matters to shareholders.

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8. Appendix

Appendix: Tables

Table A.1: Frequency of events associated to multiple companies

# of Companies	# of Events
1	44979
2	10251
3	4490
4	2188
5	1294
6	735
7	442
8	329
9	233
10	180
11-20	155
21-50	164
50-99	34
>100-362	9

Table A.2: Events in excess by sector given sample average

Sectors	Excess events
Banking & Investment Services	9354
Energy - Fossil Fuels	6378
Automobiles & Auto Parts	4758
Food & Drug Retailing	3397
Consumer Goods Conglomerates	2273
Mineral Resources	1882
Food & Beverages	1827
Personal & Household Products & Services	1612
Utilities	818
Pharmaceuticals & Medical Research	790

Notes: The table presents the sectors that have positive, excessive, mean-errors for the relation between number of events and number of companies per sector. Banking and fossil fuels.

Table A.3: RepRisk ESG risk factor, 28 Issues and 73 Topics

RepRisk 101 Risk Factors		
Topics		Issues
Abusive/illegal fishing	Involuntary resettlement	Animal mistreatment
Gambling	Land ecosystems	Anti-competitive practices
Access to products and services	Land grabbing	Child labor
Airborne pollutants	Land mines	Climate change, GHG emissions, and global pollution
Endangered species	Lobbying	Controversial products and services
Forest burning	Marijuana/Cannabis	Corruption, bribery, extortion. money laundering
Agricultural commodity speculation	Marine/Coastal ecosystems	Discrimination in employment
Deep sea drilling	Migrant labor	Executive compensation issues
Alcohol	Monocultures	Forced labor
Fracking	Mountaintop removal mining	Fraud
Animal transportation	Negligence	Freedom of association and collective bargaining
Depleted uranium munitions	Nuclear power	Human rights abuses and corporate complicity
Diamonds	Nuclear weapons	Impacts on communities
Arctic drilling	Offshore drilling	Impacts on landscapes, ecosystems, and biodiversity
Epidemics/Pandemics	Oil sands	Local participation issues
Asbestos	Opioids	Local pollution
Energy management	Palm oil	Misleading communication
Automatic and semiautomatic weapons	Plastics	Occupational health and safety issues
Biological weapons	Pornography	Overuse and wasting of resources
Chemical weapons	Predatory lending	Poor employment conditions
Economic impact	Privacy violations	Products (health and environmental issues)
Cluster munitions	Protected areas	Social discrimination
Drones	Racism/Racial inequality	Supply chain issues
Fur and exotic animal skins	Rare earths	Tax evasion
Cyberattack	Salaries and benefits	Tax optimization
Coal-fired power plants	Sand mining and dredging	Violation of international standards
Conflict minerals	Seabed mining	Violation of national legislation
Coral reefs	Security services	Waste issues
Gender inequality	Ship breaking and scrapping	
Genocide/Ethnic lensing	Soy	
Health impact	Tax havens	
High conservation value forests	Tobacco	
Human trafficking	Wastewater management	
Hydropower (dams)	Water management	
Illegal logging	Water scarcity	
Indigenous people		

Table A.4: RepRisk Languages

RepRisk searches for ESG risk incidents in 23 languages
English, Arabic, Chinese, Danish, Dutch, Filipino, Finnish, French, German, Hindi, Indonesian (Bahasa Indonesia), Italian, Japanese, Korean, Malaysian (Bahasa Malaysia), Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, and Turkish.

Table A.5: Summary statistics of RRI by event micro metrics

Metric	N	Mean	P50	SD	Min	Max	P1	P99	Skewness	Kurtosis
unsharp										
0	91526	38.726	36.000	13.254	0	82	18	64	.248	1.778
1	16477	34.49	31.000	13.329	12	78	16	62	.505	1.956
severity										
1	71993	38.202	36.000	13.345	0	79	18	64	.263	1.757
2	34046	37.758	35.000	13.378	14	82	17	64	.319	1.877
3	1964	39.198	38.000	13.035	15	73	17	65	.155	1.828
reach										
1	43180	36.162	33.000	13.234	0	79	17	63	.373	1.847
2	46832	38.495	36.000	13.098	15	79	19	64	.286	1.793
3	17991	41.601	41.000	13.48	16	82	19	66	.059	1.72
novelty										
1 rec	63756	40.551	40.000	13.453	14	82	18	65	.021	1.695
2 new	44247	34.52	31.000	12.366	0	81	17	63	.669	2.357

Table A.6: Summary statistics of ΔRRI by event micro metrics

Metric	N	Mean	P50	SD	Min	Max	P1	P99	Skewness	Kurtosis
unsharp										
0	91526	3.635	2.000	7.971	-13	70	-12	32	1.603	7.616
1	16477	3.331	2.000	6.821	-13	53	-12	25	1.027	5.437
severity										
1	71993	3.415	2.000	7.652	-13	61	-12	32	1.503	7.106
2	34046	3.943	2.000	8.097	-13	70	-12	37	1.615	8.008
3	1964	3.78	2.000	8.119	-13	48	-11	36	1.872	9.28
reach										
1	43180	3.239	2.000	7.133	-13	56	-12	25	1.215	6.144
2	46832	3.89	2.000	8.23	-13	70	-12	32	1.609	7.382
3	17991	3.641	2.000	8.182	-13	61	-12	36	1.838	8.836
novelty										
1	63756	2.296	1.000	6.337	-13	70	-12	23	1.218	7.946
2	44247	5.45	3.000	9.222	-13	58	-12	36	1.409	5.728

Table A.7: Summary statistics of micro metrics for events leading to company worst RRI level

Metric	N	Mean	P50	SD	Min	Max	P1	P99	Skewness	Kurtosis
unsharp										
0	14502	40.555	37.000	12.873	16	82	20	69	.441	2.075
1	1981	35.723	32.000	13.909	17	78	17	66	.575	2.121
severity										
1	10617	39.779	36.000	13.077	16	78	20	68	.443	2.027
2	5580	40.218	38.000	13.152	17	82	20	69	.417	2.204
3	286	42.49	41.500	12.393	19	73	20	68	.092	1.952
reach										
1	5766	37.945	34.000	13.546	17	79	19	66	.438	1.946
2	7746	39.961	37.000	12.421	16	78	21	68	.531	2.197
3	2971	43.95	41.000	13.016	18	82	23	72	.312	2.013
novelty										
1	7509	45.09	46.000	13.118	18	82	21	71	-.068	1.903
2	8974	35.694	32.000	11.437	16	78	19	66	.89	3.095

Table A.8: Two-sample t-test with unequal and equal variance

Unequal variances	obs1	obs2	Mean1	Mean2	dif	St Err	t value	p value
Peak RRI by novelty	7509	8974	45.090	35.694	9.396	.194	48.55	0
Peak RRI by unsharp	14502	1981	40.556	35.723	4.833	.331	14.65	0
Equal variances	obs1	obs2	Mean1	Mean2	dif	St Err	t value	p value
Peak RRI by novelty	7509	8974	45.090	35.694	9.396	.192	49.1	0
Peak RRI by unsharp	14502	1981	40.556	35.723	4.833	.311	15.5	0

T-Test with both equal and welch-unequal variance yield same results for all three RRI variables by novelty and unsharp groups are statistically significant difference at least at a 1% level.

Table A.9: Distribution of Event Metrics per number of firms

Event Characteristics	Value	Nr. of Events	Nr. of Firms
Unsharp	0	54,935	1,844
	1	2,346	1,427
Novelty	1	40,201	1,424
	2	22,832	1,888
Severity	1	41,635	1,814
	2	16,681	1,584
	3	810	490
Reach	1	19,538	1,707
	2	27,030	1,717
	3	10,564	1,207

Table A.10: Data Sources

Data	Source
Stock Prices	Refinitiv Eikon
Market Return	Kenneth French's Website
Event Metrics	RepRisk
Reputational Risk Index (RRI)	RepRisk

Table A.11: Results Sectors 1

	Applied Resources	Automobiles & Auto Parts	Banking & Investment	Chemicals	Consumer Goods Conglomerates	Cyclical Consumer Products & Services
1	-0.047 (-0.08)	-0.595 (-1.121)	0.32 (0.733)	0.203 (0.47)	-0.222 (-0.223)	-0.121 (-0.347)
2	0.196 (0.233)	-0.884 (-1.235)	0.315 (0.581)	0.482 (0.806)	-1.162 (-0.842)	-0.239 (-0.49)
3	-0.258 (-0.257)	-1.377 (-1.469)	0.699 (1.005)	0.066 (0.084)	-2.407 (-1.364)	-0.293 (-0.483)
4	-0.403 (-0.358)	-1.671 (-1.546)	0.898 (1.165)	0.187 (0.206)	-3.391 (-1.594)	0.007 (0.01)
5	-0.788 (-0.579)	-2.715** (-2.221)	1.231 (1.443)	0.016 (0.015)	-4.381* (-1.863)	0.942 (1.13)
6	0.347 (0.219)	-2.631** (-1.981)	1.561* (1.697)	-0.503 (-0.465)	-4.384* (-1.822)	0.84 (0.93)
7	1.589 (0.939)	-3.011** (-2.124)	1.89* (1.859)	-0.836 (-0.675)	-3.489 (-1.344)	0.772 (0.748)
8	1.979 (1.125)	-2.604* (-1.67)	2.006* (1.83)	-0.863 (-0.649)	-3.789 (-1.351)	1.117 (0.987)
9	1.467 (0.779)	-2.03 (-1.177)	2.036* (1.756)	-1.559 (-1.085)	-3.435 (-1.172)	0.283 (0.228)
10	0.593 (0.278)	-1.509 (-0.821)	2.012 (1.629)	-1.691 (-1.105)	-4.134 (-1.32)	0.332 (0.242)
11	0.815 (0.351)	-1.942 (-1)	2.385* (1.779)	-2.227 (-1.35)	-3.991 (-1.229)	0.104 (0.073)
12	1.87 (0.769)	-1.886 (-0.915)	2.286 (1.576)	-1.996 (-1.126)	-3.895 (-1.112)	-0.197 (-0.131)
N	**176**	**278**	**1293**	**404**	**64**	**844**

Note: *t* statistics in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; CAAR expressed as percentages

Table A.12: Results Sectors 2

	Energy - Fossil Fuels		Food & Beverages		Food & Drug Retailing		Healthcare Services & Equipment		Holding Companies		Industrial & Commercial Services	
1	-0.996**	(-2.223)	0.16	(0.555)	0.028	(0.058)	-0.111	(-0.336)	-0.257	(-0.355)	-1.673***	(-2.884)
2	-1.56***	(-2.674)	0.459	(1.111)	-0.092	(-0.13)	0.199	(0.433)	0.006	(0.005)	-1.948***	(-2.751)
3	-2.781***	(-3.859)	0.429	(0.846)	0.174	(0.193)	-0.153	(-0.289)	0.557	(0.393)	-1.962*	(-2.385)
4	-3.355***	(-4.085)	0.317	(0.547)	0.49	(0.399)	0.135	(0.219)	0.354	(0.225)	-1.716*	(-1.84)
5	-3.77***	(-4.023)	0.523	(0.782)	0.957	(0.665)	0.311	(0.433)	-0.162	(-0.089)	-1.786*	(-1.711)
6	-3.176***	(-3.026)	0.402	(0.531)	1.374	(0.847)	0.405	(0.513)	-1.637	(-0.839)	-2.167*	(-1.912)
7	-3.474***	(-3.015)	-0.308	(-0.362)	1.654	(0.921)	0.757	(0.859)	-1.286	(-0.59)	-2.242*	(-1.766)
8	-3.128**	(-2.492)	-0.32	(-0.347)	2.297	(1.186)	1.214	(1.236)	-0.712	(-0.252)	-1.969	(-1.588)
9	-3.304**	(-2.404)	-0.552	(-0.546)	2.179	(1.023)	0.785	(0.764)	-0.288	(-0.092)	-2.658*	(-1.915)
10	-3.017**	(-2.062)	-0.757	(-0.686)	2.526	(1.106)	0.651	(0.579)	-1.891	(-0.637)	-2.394	(-1.623)
11	-3.725**	(-2.308)	-0.51	(-0.428)	2.896	(1.211)	0.951	(0.792)	-2.519	(-0.793)	-2.359	(-1.466)
12	-3.962**	(-2.263)	-0.189	(-0.149)	2.611	(1.037)	0.96	(0.75)	-2.193	(-0.641)	-1.818	(-1.135)
N	**946**		**690**		**326**		**644**		**42**		**797**	

Note: *t* statistics in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; CAAR expressed as percentages

Table A.13: Results Sectors 3

	Industrial Goods	Insurance	Mineral Resources	Personal Products	Pharmaceuticals & Medical Research	Real Estate
1	-0.054 (-0.172)	0.095 (0.196)	-1.196* (-1.84)	0.624 (1.279)	0.362 (0.867)	0.57 (0.873)
2	-0.336 (-0.793)	0.102 (0.159)	-1.222 (-1.324)	1.532** (2.269)	-0.303 (-0.501)	0.577 (0.689)
3	-0.199 (-0.376)	-0.29 (-0.391)	-1.277 (-1.132)	1.757** (2.145)	-0.376 (-0.514)	0.102 (0.099)
4	0.294 (0.486)	-0.804 (-1.039)	-1.535 (-1.144)	2.382** (2.487)	-0.171 (-0.194)	-1.098 (-0.864)
5	0.433 (0.612)	0.081 (0.081)	-1.346 (-0.889)	2.328** (2.169)	0.159 (0.154)	-0.333 (-0.228)
6	0.396 (0.52)	-0.149 (-0.126)	-1.539 (-0.91)	2.725** (2.151)	0.095 (0.079)	-1.031 (-0.625)
7	0.68 (0.8)	-0.631 (-0.478)	-1.314 (-0.707)	2.357* (1.718)	-0.205 (-0.157)	-0.862 (-0.458)
8	1.07 (1.128)	-0.906 (-0.645)	-1.76 (-0.891)	2.309 (1.571)	-0.232 (-0.163)	-1.074 (-0.512)
9	1.368 (1.344)	-1.111 (-0.76)	-1.624 (-0.755)	2 (1.303)	-0.001 (0)	-1.362 (-0.611)
10	1.457 (1.306)	-1.329 (-0.841)	-2.434 (-1.075)	2.228 (1.333)	-0.387 (-0.243)	-1.33 (-0.547)
11	1.248 (1.048)	-1.555 (-0.92)	-3.205 (-1.308)	1.994 (1.115)	-0.408 (-0.24)	-2.414 (-0.913)
12	1.182 (0.936)	-1.423 (-0.782)	-3.601 (-1.364)	1.353 (0.719)	-0.362 (-0.204)	-2.244 (-0.775)
N	**758**	**506**	**480**	**222**	**599**	**173**

Note: *t* statistics in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; CAAR expressed as percentages

Table A.14: Results Sectors 4

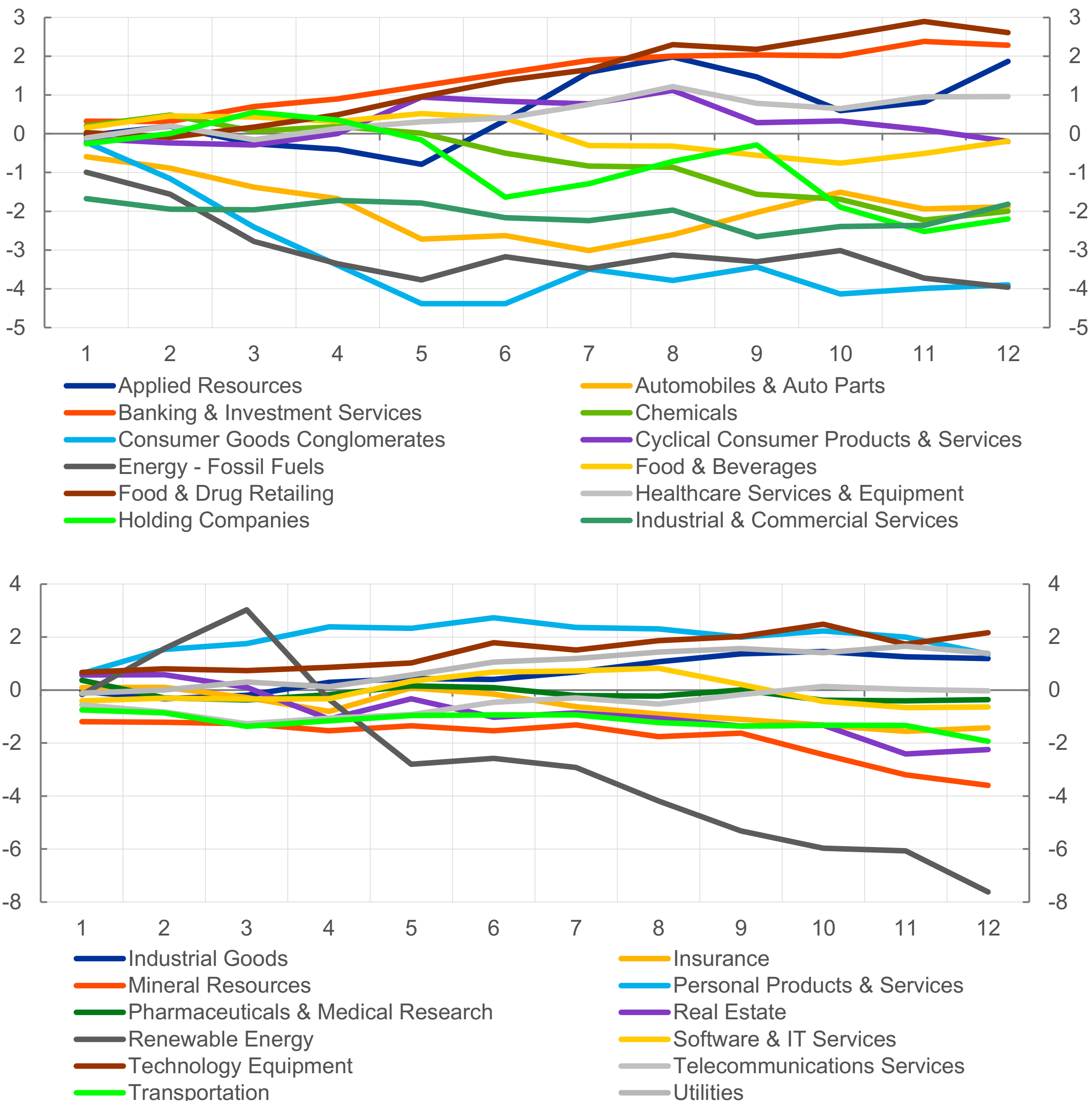
	Renewable Energy	Software & IT Services	Technology Equipment	Telecommunications Services	Transportation	Utilities
1	-0.174 (-0.083)	-0.411 (-0.972)	0.663 (1.265)	-0.565* (-1.795)	-0.752* (-1.945)	-0.119 (-0.448)
2	1.56 (0.509)	-0.313 (-0.544)	0.794 (1.045)	-0.827** (-1.984)	-0.858 (-1.52)	0 (0.001)
3	3.029 (0.665)	-0.34 (-0.505)	0.733 (0.751)	-1.277** (-2.506)	-1.372** (-2.016)	0.305 (0.69)
4	-0.349 (-0.071)	-0.326 (-0.416)	0.856 (0.743)	-1.061 (-1.678)	-1.167 (-1.396)	0.123 (0.239)
5	-2.799 (-0.509)	0.338 (0.372)	1.019 (0.784)	-0.929 (-1.303)	-0.962 (-0.997)	0.569 (0.976)
6	-2.576 (-0.371)	0.674 (0.653)	1.789 (1.219)	-0.463 (-0.554)	-0.945 (-0.856)	1.051 (1.569)
7	-2.922 (-0.352)	0.719 (0.627)	1.51 (0.936)	-0.296 (-0.328)	-0.94 (-0.753)	1.192 (1.607)
8	-4.185 (-0.445)	0.825 (0.657)	1.865 (1.081)	-0.534 (-0.543)	-1.23 (-0.917)	1.432* (1.687)
9	-5.31 (-0.542)	0.211 (0.159)	2.016 (1.038)	-0.173 (-0.16)	-1.362 (-0.941)	1.56* (1.653)
10	-5.97 (-0.566)	-0.432 (-0.298)	2.486 (1.197)	0.139 (0.117)	-1.332 (-0.866)	1.408 (1.414)
11	-6.071 (-0.542)	-0.661 (-0.42)	1.73 (0.761)	0.022 (0.017)	-1.343 (-0.815)	1.655 (1.556)
12	-7.615 (-0.653)	-0.642 (-0.382)	2.159 (0.902)	-0.027 (-0.019)	-1.938 (-1.117)	1.381 (1.242)
N	**44**	**509**	**365**	**604**	**587**	**831**

Note: *t* statistics in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; CAAR expressed as percentages

Appendix: Figures

Figure A1: ESG_C classification by RepRisk

Figure A.2: Cumulative Average Abnormal Returns by Sector



Note: All returns, significant and insignificant plotted in the chart