Do corporate bond markets value environmental, social or corporate governance events?

Preliminary version
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Abstract

The aim of this paper is to measure the impact of environmental, social and governance news on corporate bond prices and credit default swap premiums for the Eurozone market. We consider daily bond prices and credit default swap premiums for 85 firms and 1027 events from 12/04/2003 to 31/07/2011. Each firm is affected at least by one piece of news related to its environmental, social and governance practices. Each news is then flagged with an indicator of importance. Note however that our database constraints us to consider only negative events. Abnormal bond returns are computed by subtracting return from a matching portfolio to the return of the observed bond return. Abnormal credit default swap return is calculated with a regression of the observed bond return on an equiweighted index that is constructed in order to transpose our bond universe on the credit default swap market. Several parametric and non parametric tests do not show any significant impact of these negative events as a whole on corporate bond prices, even if there are evidence of some impact of two subcategories of social events. When considering all events, we find a slight but counter-intuitive decrease of the credit default swap premium within the 5 following days of the event.

JEL Classification: G12, G14, G30.

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1 Introduction

We evaluate the impact of published news related to the environmental performance, the social practice or the governance (henceforth ESG news) of firms on corporate bond prices. Our objective is to assess if, and to which extent, corporate bond market reacts to these kinds of events. This study sheds light on how corporate managers should consider stakeholder's interests. It is linked to the debate on the importance to be given to shareholders and stakeholders in the setting of firms' objectives. It is of particular importance to firms, as bonds are an important source of financing, as well as to portfolio managers interested in factors affecting bond returns.

To our knowledge, most studies focus on stock markets reaction to ESG news. For instance, in a recent paper close to ours, Krüger (2009) assesses the impact of ESG news on stock returns for a sample of 836 companies between 2001 and 2007. He shows that a significant negative abnormal return is observed after the release of a negative event but a positive event has no significant effect. A related field of research deals with the relation of corporate social responsibility (henceforth CSR), measured by an index or portfolio, with firms' financial performance. Surveys of Orlitzky *et al.*(2003) and Margolis *et al.*(2007) report evidence that CSR tends to increase firms' financial performance measured by stock market capitalization. Studies such as Renneboog *et al.* (2008) and Amenec *et al.* (2008) report negative but statistically insignificant results. These surveys report only a few results as it stands on the relation between CRS and the corporate bond market.

However, empirical conclusions from stock cannot be applied directly on corporate bond return. Stock and bond are not affected by news through the same channel. Bad news adversely impact stock return as they are expected to reduce a firm's profit. They interact with bond markets through their expected impact on the firm's default risk. An environmental disaster, for instance, will induce unexpected expenses that could be financed by issuing debt. The following degrading of the firm's balance sheet may induce a higher cost of issuing debt. In this sens, CSR could be seen as a risk mitigating policy by preventing the risk of extreme negative events. Inadequate corporate governance, for instance, may also affect the firm's financial performance and thereby increases its default risk. On the opposite, an efficient corporate governance may foster financial performance and facilitate debt financing. An important difference is that bondholders and shareholders do not have the same loss functions. Bondholders are fixed claimants and have an asymmetric exposure to the downside risk of their securities relative to upside potential. In the position of residual claimants, shareholders are sensitive to upside and downside potentials. If we make the assumption that bondholders are more risk adverse than shareholders, we can infer that the former will be more penalized than the latter by negative events. Therefore, we can expect that bad news will exert a greater impact on bond prices than good news. Another difference between the stock market and the bond market is the greater risk of illiquidity of the latter.

Sharfman and Fernando (2008), Menz (2010), Chen *et al.* (2007) study the relationship between different aspects of corporate social responsibility and the cost of debt financing. On the whole, they do not find evidence that CSR reduces the cost of debt, which contradicts their theoretical analysis. Goss and Roberts (2011) show that socially responsible firms do not benefit from lower interest rates. However, Bauer and Hann (2010) find a negative relationship between the strength of the environmental profile of US public firms and their credit spread. In spite of these papers, there is still too few research on the relation between CRS and the corporate debt market. This paucity can be partly explained by the difficulty to obtain data on the debt market, its illiquidity compared to the stock market and some characteristics of the bonds that make it more difficult to apply usual statistics that are used on stocks.

Our approach is different from the aforementioned references. We resort to an event study to measure the impact of ESG news on corporate bond and credit default swap prices. The event study methodology has been described in numerous surveys, the most recent being Kothary and Warner (2007) and Corrado (2011). These papers are mainly concerned with event studies on the stock market. Bessembinder *et al.* (2008) expose the specificities of event studies applied to the corporate bond market. One difference with stocks is that abnormal bond return is computed from comparison with a matching portfolio.

We use Barclay's Euroaggregate Corporate index as our universe coupled with 1027 ESG events for 85 firms. These events come from a database of Amundi's Sustainable Investing department. We use daily data from 12/04/2003 to 31/07/2011 of all corporate bonds issued within the Euroaggregate Corporate universe. We only use credit default swaps of bonds we have in our database. Brown and Warner (1985) and Bessembinder *et al.* (2009) show that tests with daily returns are more powerful compared to monthly returns, particularly in small samples. Daily returns also reduce the risk of contaminated events which may bias abnormal return from zero.

We apply usual parametric tests (Patell (1976), Boehmer *et al.* (1991)) and non parametric tests (Corrado (1989), Wilcoxon (1945)). When applied on single day abnormal returns, non parametric tests dominate parametric tests. However, as shown by Cowan (1992) and Kolari and Pynnönen (2010), their efficacy is reduced when they are applied on cumulative abnormal returns. Recently, Kolary and Pynnönen (2011) have extended the Corrado (1989) and Corrado and Zivney (1992) rank tests to cumulative returns. We will apply their generalized rank (hence GRANK) test that has, in all likelihood, superior performance compared to parametric tests.

In any of the three ESG categories, the events tested do not have a significant impact on bond prices. The differentiation of five degrees of importance of these events does not change our results.

The outline of the paper is as follows. Section 2 gives a short literature review and sets the tested hypothesis. We describe our data in section 3. We present the statistical tests and our empirical findings in section 6. We conclude and give some insights for our future research in section 7.

2 Previous literature

The relation between environmental, governance and social practice of firms and their financial performance has attracted much debate in recent years. This controversy is fed by arguments from economics, management and finance. As reminded by Kacperczyk (2009), the two main thesis in play could be described as the "shareholder theory" and the "stakeholder theory". Freeman (1984) defines a stakeholder as "any group or individual who can affect or is affected by the achievement of an organization's purpose". These theories defend opposite views on the role CSR should play in the definition of a firm's objectives.

The "shareholder theory" considers that corporate managers should increase the wealth of shareholders and that they have no responsibility towards non-shareholding stakeholders, as employees, customers, natural environment or communities. This thesis is notably upheld by Friedman (1970), Jensen and Meckling (1976) and Fama and Jensen (1983). Friedman (1970) posits that maximising shareholders wealth benefits society at its most if the company does not trangress the legal framework. The main argument raised by economists against CSR is that it increases costs without fostering profits. As shown by Barnea and Rubin (2005), CRS investment is not always motivated by maximizing profit but could result from agency conflicts between shareholders and managers. Investment managers can have an incentive to favour CSR investment at the expense of a firm's financial profits.

The stakeholder theory (Freeman *et al.* (2007)) states that corporations should consider the interests of each class of stakeholders in their decision making. Heals (2005) finds argument in favour of corporate social responsibility in neo-classical microeconomics. As government cannot resolve all problems resulting from externalities and that competitive markets are not efficient, Heals considers that corporate social or environmental activities should substitute to missing markets and regulation if external costs arise from them. CSR can also help to reduce conflicts between firms and stakeholders such as non-governmental organizations. The reduction of these conflicts could arguably increase corporate profits or financial performance at least in the long-run. CSR can also be considered as a risk mitigating policy. As a result, firms with a high degree of CSR could therefore be more attractive to investors.

The stakeholder view can be reinforced by arguments from the strategic management literature. The stakeholder theory suggests that management must satisfy several groups that have some interest or "stake" in a firm and can therefore influence it. Firms could commit to socially responsible behaviour to avoid the loss of the stakeholders' support. The resource-based view of the firm could give a third argument in favour of a positive relationship between CRS and financial performance. In this view, economic performance depends on internal resources and capabilities that are valuable, rare and difficult to imitate or substitute. Stakeholder management can be considered as an important organizational capability and a good reputation can be a valuable asset make access to financing easier.

To conclude, these different arguments plea in favour of a positive effect of CSR on firms' financial performance. We could thus infer that better financial performance reduces a firm's credit risk.

Some papers study the relationship between CRS and the cost of debt. Most of them find that CRS does not reduce debt cost. Sharfman and Fernando (2008) evaluate the impact of environmental performance on the cost of capital for US firms listed in the SP 500. Debt financing is one component of the cost of capital. The authors assume that a better environmental performance should reduce the cost of capital. One argument is that a better environmental performance reduces the expectation of financial distress, caused by an unexpected extreme environmental event. However, their empirical results do not confirm this conclusion as they find a positive relation between the cost of debt and their indicator of environmental performance. Finally, they find that environmental performance reduces the overall cost of capital, that is the cost of equity financing and the cost of debt financing. Menz (2010) studies the relationship between the Euro corporate bond credit spread and an index including environmental, social and corporate governance practices. He uses monthly data from July 2004 to August 2007. His estimates show weak evidence of a positive effect of CSR on bond credit spreads. Goss and Roberts (2011) study the relation between corporate social responsibility and the cost of bank loans for US firms. They find that firms with CRS problems tend to pay higher interest rates. Bauer and Hann (2010) look at the relation between the environmental profile of 582 public US firms and their credit spread from 1995 to 2006. They find that environmental concerns are linked with a higher cost of debt financing and lower credit ratings, whereas a sound environmental profile is correlated with a lower cost of debt. However, a socially responsible firm does not seem to benefit from lower interest rates. In the case of low-quality borrowers, CRS even increases interest rates as it is interpreted as a diversion of the firm resources by managers.

Our paper differs from those cited as we focus on the effect of ESG news on bond and credit default swap prices. We assume that negative (positive) events will increase (decrease) the firm's credit risk. We expect that risk-averse bondholders will reduce their exposure to riskier firms and that the market price of their bond will drop. On the other side, positive events are expected to reduce credit risk thus an increase (decrease) in bond market (credit default swap) value.

3 Data

3.1 Bond prices

We use Barclay's Euroaggregate Corporate index as our universe. We have daily data from 04/12/2003 to 07/31/2011. Bonds with no reported events are excluded. We thus analyse 85 firms' bond prices. We consider the dirty price, that is the clean price plus accrued interests. All characteristics like yield to maturity, maturity, duration and convexity are given by Barclay's and computed with discrete compounded interest rates. Callable, puttable, convertible and floating bonds are excluded. It would be too cumbersome to control for volatility stemming from included options. Subordinated debt is also excluded as it does not behave like plain vanilla debt. When a company issues more than one bond, we take the bond with duration closest to 3.5 which is the median duration of our universe.

To date Barclays has no indicator of trade size or number of trades in a given period. We check for illiquidity by looking at the movement of prices. Bonds with a zero return at least twice during the ten days preceding the event are excluded from our sample.

Regarding the credit default swap market, we use daily data of the same period as for our 85 bonds. All data come from Marktit. We only consider credit default swaps denominated in euro with a maturity of 5 years and the two restructuring clauses mainly used in Europe: modified restructuring (MR) and modified-modified restructuring (MM). In case there is no data available for a credit default swap using the MR clause, we fill the gap by using the data of its equivalent with the MM clause. According to our tests, both series have an almost perfect correlation.

3.2 Events

We store 1027 events linked to 85 companies from Amundi's data base. Each event is classified in one of the following three categories: environmental, social and corporate governance. This classification with its sub-categories is displayed in Table 1. The first category covers environmental issues such as pollution, climate change and green investing. The second covers everything related to community relations, diversity, employee relations, human rights and product safety. The third refers to corporate governance issues such as transparency, ethics, accounting, corruption and more generally everything related to ownership.

Each event is characterized as "positive" (or "good news") or "negative" ("bad news"). Its relative importance is assessed by a discrete number ranging from 0 (minor event) to 4 (major event). For each event, we also dispose of the publication source as well as a short description. All important events are flagged so that they can be analysed separately.

Moreover, since the database contains all the publishers, sources can be traced regarding the importance and the time needed for a news item to be incorporated into the bond price. There is strong evidence that the events included in the database are independent and that there is no event day clustering.

As only a few positive events are reported in our database, we can only test for the impact of reported negative events. This bias towards negative events has already been pointed out for instance by Krüger (2009). A possible explanation given by this author is that negative news are more frequently reported by media and are therefore more easily found.

The event study methodology makes the assumption that events are exogenous. However, even though there is no doubt the event is exogenous, its reporting as bad or good news can be induced by the observation of abnormal return. In this case, event reporting becomes endogenous which affects the good properties of the tests for abnormal returns. Although we do not ignore this potential problem, we leave the proper treatment of the endogeneity of the reported events to future research.

4 Corporate bond returns and abnormal returns

As suggested by Bessembinder *et al.* (2008), we compute a corporate bond holding period return as:

$$R_t = \frac{P_t - P_{t-1} + AI_t}{P_{t-1}}$$

where P_t and P_{t-1} are respectively the bond transaction price at time *t* and *t-1*. AI_t is the accrued interest[1] over day *t*.

Abnormal bond return is the difference between bond returns conditional and unconditional to the event. In an equity universe, the abnormal performance is usually estimated by means of the Capital Asset Pricing Model. This framework can be extended to include other risk factors such as Value/Growth and size as in Fama and French (1993). This approach is seldom applied to bond data. Firstly, because we do not have a model to explain daily bond returns. Second, because using matching portfolios gives more precise abnormal returns as shown by Barber and Lyon (1997) and Bessembinder *et al.* (2008). We apply the matching portfolio approach and compute the abnormal return AR_t as:

$$AR_t = R_t - EBR_t$$

where EBR_t represents the return of the matching portfolio.

The matching portfolio is constructed in a way that its duration matches exactly the dura-

[1] AI_t is defined as the coupon payment multiplied by the ratio of days passed since *t-1*

tion of the reference bond on the event date. To do this, we create a market-value weighted portfolio with the 20 closest bonds in terms of duration to the reference bond that are above the duration of the reference bond. We do the same for the 20 closest bonds whose duration is below the reference bond. A linear combination is used to match the duration of these two portfolio to the duration of the reference bond. We then calculate the returns for the matching portfolio over an estimation window of 150 returns. The formula above describes how we calculate abnormal returns. We discarded the idea of constructing equi-weighted matching portfolios because the index of our universe is a market value weighted index.

If the exact event date is unknown or we expect a lasting impact of the event, the cumulative abnormal return around the event date has to be analysed. This cumulative abnormal return is defined as follows:

$$CAR_t = \sum_{l=t-h}^{t+j} AR_l,\ j \geq 0,\ h \geq 0$$

where t is the event date and $j + h + 1$ is the number of included returns.

5 Credit default swap returns and abnormal returns

A credit default swap protects its buyer against a credit event of the underlying bond. Therefore, the buyer has to remunerate the seller with regular (usually quarterly) payments until maturity. These regular payments are named the "premium leg" while the "protection leg" is the payment by the seller in case of a credit event.

In our database (and in general), we only observe the spread of a credit default swap. This spread is equal to the annualized premium paid by the buyer. In order to calculate daily holding period return, we thus need to value the premium leg on a mark-to-market basis. As stated by O'Kane and Turnbull (2003) the mark-to-market value is given by:

$$MTM_{i,t} = S_{i,t} \times RPV01_{i,t}$$

where $MTM_{i,t}$ is the mark-to-market value, $S_{i,t}$ the default swap spread and $RPV01_{i,t}$ the risky present value at day t and for firm i of a one basis point premium stream that ends at maturity or default, whichever sooner. Differently said, $RPV01_t$ is the discounted arbitrage free survival probability of the underlying. The return on the credit default swap is then defined as the rate of return of the mark-to-market value:

$$R_{i,t} = \frac{MTM_{i,t}}{MTM_{i,t-1}} - 1 = \frac{S_{i,t} \times RPV01_t}{S_{i,t-1} \times RPV01_{i,t-1}} - 1$$

Following Micu *et al.* (2006), we assume that the risky present value is constant between two consecutive dates: $RPV01_{i,t} = RPV01_{i,t-1}$. According to their study, the average daily change in the risky present value is close to zero. The reason is that survival probabilities and recovery rates are far less volatile than credit risk on a very short time horizon such as one day. The return depends much more on the change in credit risk and thus simplifies to:

$$R_{i,t} = \frac{S_{i,t}}{S_{i,t-1}} - 1$$

Contrary to credit bonds, we only use credit default swaps with a maturity of 5 years. We are thus allowed to apply the same event study methodology as on stocks to extract the abnormal return. Our approach is divided into three steps: estimation of the abnormal return, control for a time-varying volatility, computation of a test statistic.

The abnormal return $AR_{i,t}$ is the residual from an linear regression of the return of a credit default swap on an equiweighted index built with all credit default swaps available in our sample on day *t*. This regression is estimated by OLS and gives us:

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{index,t}$$

where $\hat{\alpha}_i$ and $\hat{\beta}_{i,}$ are the estimated parameters and $R_{index,t}$ the return of the CDS equiweighted index on day *t*.

In the following step, we apply the Engle (1988) ARCH-LM test to detect if return volatility is time dependent and likely to change during the price adjustment due to the event. We consider three different time-varying volatility models. The first one is the standard GARCH(1,1) model:

$$\sigma_t^2 = \omega + \alpha AR_{t-1}^2 + \beta \sigma_{t-1}^2$$

$$\omega > 0\, \alpha \geq 0,\, \beta \geq 0,\, \alpha + \beta < 1$$

where σ_t^2 is the conditional variance on day *t*.

We then adapt the asymmetric volatility models TGARCH(1,1) and GJR-Garch(1,1) (Glosten *et al.* (1993)) to our needs to capture an asymmetric effect of a change in credit default swap on volatility. As a matter of fact, an increase in the spread of a credit default swap means that the underlying bond becomes riskier which could potentially translate into a higher volatility compared to a reduction of the spread. The TGarch(1,1) (Zakoian (1994)) is[2]:

$$\sigma_t = \omega + \alpha |AR_{t-1}| + \gamma \times 1_{AR_{t-1}>0} \times |AR_{t-1}| + \beta \sigma_{t-1}$$

[2]The interested reader is refered to Bollerslev (2009) for further details.

where $1_{AR_{t-1}>0} = 1$ if $AR_{t-1} > 0$ and 0 if not. The parameter γ captures the importance of the asymmetric effect.

The GJR-Garch(1,1) is as follows:

$$\sigma_t^2 = \omega + \alpha AR_{t-1}^2 + \lambda \times 1_{AR_{t-1}>0} \times AR_{t-1}^2 + \beta\sigma_{t-1}^2$$

The parameter λ measures the asymmetric effect.

We estimate the three GARCH models and perform a chi-squared test if the GJR-GARCH or TGARCH are a better fit. If an asymmetric GARCH fits the data better, we simply use the model with the highest likelihood[3].

We then divide our time series of residuals either, in absence of an ARCH effect, by the unconditional volatility as measured by the standard deviation or by the conditional volatility as measured by the appropriate GARCH model.

In this preliminary draft we do not control for sector biases as our universe is too limited. The final draft will include another explicative variable such as the return of the financial sector minus the the return of the industrial sector.

6 Empirical results

6.1 Tests for abnormal returns

We apply parametric tests (Patell (1976), Boehmer *et al.* (1991)) and nonparametric tests (Corrado (1989) RANK test, Wilcoxon signed rank test). Parametric tests are widely used, but their properties crucially depend on the assumption on the return's distribution. Bessembinder *et al.* (2008) show that the sign and the rank test outperform the standard t-test for single day abnormal returns.

Cowan (1992) and Kolari and Pynnönen (2010) show however that the efficacy of nonparametric tests is seriously reduced when extended to cumulative abnormal returns. Kolari and Pynnönen (2011) proposed an extension of Corrado's (1989) rank test to cumulative returns. We briefly present this test and refer readers to the aforementioned surveys on event studies for a presentation of the usual tests.

We use Campbell *et al.*(1997) notations. Day $t = 0$ indicates the event day. The estimation period relative to the event day is $t = T_0 + 1,...,T_1$ and $t = T_1 + 1$, $T_1 + 2,...,T_2$ is the event window. $L_1 = T_1 - T_0$ is the estimation period length, $L_2 = T_2 - T_1$ the event period length. $L = L_1 + L_2$ is the length of the combined estimation and event periods. We define the

[3]Models are estimated with a Gaussian distribution.

bond's i standardized abnormal returns as:

$$SAR_{it} = \frac{AR_{it}}{S_t}$$

where S_t is the standard deviation of the cross sectionial abnormal bond returns. The bond's i cumulative abnormal return over l event days (the CAR period) is then defined as:

$$CAR_{i,l} = \sum_{t=t_1+1}^{t_1+l} AR_{it}$$

with $T_1 \leq t_1 \leq T_2 - l$ and $1 \leq l \leq L_2$. As Boehmer *et al.* (1991), we standardize $CAR_{i,l}$ with the cross sectional standard deviation to obtain:

$$SCAR_i^* = \frac{CAR_{i,l}}{S_{SCAR_l}}$$

where

$$S_{SCAR_l} = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(SCAR_{il} - \overline{SCAR}_l)^2}$$

is the cross-sectional deviation of cumulated abnormal returns and $\overline{SCAR}_l = \frac{1}{n}\sum_{i=1}^{n} SCAR_{il}$. n is the number of abnormal returns. The generalised standardized abnormal returns (GSAR) are defined as:

$$GSAR_{it} = \begin{cases} SCAR_i^*, \; for\; t_1 + 1 \leq t \leq t_1 + l \\ SAR_{it}, \; for\; t = T_0 + 1, ..., t_1, t_1 + l, ..., T_2 \end{cases}$$

Kolari and Pynnönen (2011) test is a rank test applied to $GSAR_{it}$. The demeaned standardized abnormal rank is defined as:

$$U_{it} = \frac{Rank(GSAR_{it})}{T+1} - 1/2$$

for $i = 1, ..., n$, where $t \in \Gamma = \{T_0 + 1, ..., T_1, 0\}$ is the set of time indexes including the estimation period and the cumulative abnormal return at $t = 0$. $T_0 + 1$ and T_1 correspond to the first and last observations in the estimation period and $T = T_1 - T_0 + 1$ is the total number of observations. $Rank(GSAR_{it})$ replaces $GSAR_{it}$ by its rank number 1,...,T. U_{i0} denotes the rank on the cumulative abnormal return. Under the null hypothesis of no event effect, expected value of U_{i0} should be equal to zero for all $i = 1, ..., n$. Kolary and Pynnönen define the generalized rank t-statistics (GRANK-T) as follows:

$$t_{grank} = Z\left(\frac{T-2}{T-1-Z^2}\right)^{1/2}$$

where $Z = \frac{\bar{U}_0}{S_{\bar{U}}}$ with $S_{\bar{U}} = \sqrt{\frac{1}{T}\sum_{t\in\Gamma}\bar{U}_t^2}$ and $\bar{U}_t = \frac{1}{n}\sum_{i=1}^{n} U_{it}$.

Under the null hypothesis of no event, t_{grank} approaches the standard normal distribution as $T \to \infty$.

6.2 Impact on bond returns

Table 2 reports several descriptive statistics as well as the results of tests for abnormal returns for all ESG events. We observe that the average single day abnormal return is equal to zero and that its maximum value is positive. Judging from these results, the overall impact of ESG news is insignificant and some negative events have an unexpected positive effect on bond prices. Tests for abnormal returns confirm that our ESG events have no noticeable impact on bonds prices. Regarding the aggregate sample of all three ESG categories, tests for abnormal returns are not significant, with one exception. The cumulative t-test over a five-day event period is positively significant at the 10 % level for the sample that pools all degrees of importance. This result is quite surprising as we expect that negative events have a negative effect on bond prices. One possible explanation is that these news were less damaging than expected by market participants. Moreover, bad CSR news can be accompanied by good financial news that outweighs the former. A massive lay-off, for instance could be bad news in terms of CSR but good news in terms of reducing costs and increasing profit. Yet, the t_{grank} test over the same event period doesn't confirm this result. To conclude, we find very tenuous evidence of a general impact of ESG related news on bond prices.

Table 4 reports the same results for news separated in their categories. For each of the three categories, the average abnormal return is almost equal to zero. However, we observe that abnormal returns reach their lowest value for environment related news. It seems therefore that these kind of events have the greater impact on bond prices. However, tests do not show any evidence of a statistically significant effect of environmental related news on corporate bond prices.

In the social category, the Corrado test is significant at the 1 % level for events that are rated as the least important and significant at the 10 % lever for all degrees of importance. A positive statistic here means that we have a significant proportion of low ranked abnormal returns in our sample. Thus negative abnormal returns outweigh the positive ones. Nevertheless, all other tests show no sign of significant abnormal return. The BMP test shows significant positive abnormal return for events associated to the first degree of importance and significantly negative abnormal return for the third degree of importance at the 5 % and the 10 % level respectively. We find some minor evidence of an impact of social news on corporate bond prices.

Events related corporate governance have no significant effect on bond prices. Note that we obtain the highest (positive) abnormal return for this category of events. Its seems that there is some difference in the impact of these events compared to environmental or social events.

Looking at the whole picture that can be drawn from these results tells us that ESG news have a limited impact on corporate bond prices. Several explanations can be given. The first one is that a change in bond prices is too insensitive to the change in bond risk induced by ESG news due to illiquidity. The opposite explanation, raised for instance by Menz (2010), is that CSR criteria play a minor role in bond pricing.

6.3 Impact on credit default swap returns

Table 5 shows the results of tests on single-day and cumulative abnormal returns for all ESG events. Regarding all degrees of importance, no single day abnormal return is significant. Only the cumulative t-test over 5 days after the event and the GRANK test over 5 days are significant at the 1 % and 10 % level, respectively. However, the sign of the cumulative t-test is negative which is counter intuitive but accords with previous results from bond returns.

More detailed results for cumulative abnormal returns for different event windows are reported in Table 6. The cumulative t-test over 2 days is significant at 10 % and at 1 % with 5 days. It seems therefore that enlarging the event window strengthens the significance of abnormal returns. However, we still find that negative events lead to negative abnormal returns. If we split the events according to their degree of importance, we see that most of the significant abnormal returns stem from the events with an importance of 1 or 2.

If we take into account the day before the event day the GRANK test becomes significant at the 5 % level while it is only significant at 1 % for a 5 days window after the event. Events of importance 1 are significant at 1 % with the -1/+5 event window. Surprisingly events of more importance are never significant.

Results for the three environmental, social and governance events are displayed on Table 7. Examining the environmental category reveals that only the cumulative t-test over 5 days is significant at the 10 % level for events with the degree of importance of 1. All other tests do no exhibit any sign of significance.

Social events pooled together are significant at the 10 % level according to the cumulative t-test over 5 days. Splitting up the events relative to their importance uncovers that the events with flagged with a zero are significant at the 5 and 10 % levels according to the sign test and the cumulative t-test over 5 days. The sign test is significant at the 10 % level for events with an importance of 1. Thus negative social news have a potential negative impact on the credit default spread. Most important events do no have any noticeable impact. This is in line with our few significant results on the bond market. Nevertheless, there is no obvious explanation for these results and they should be treated with caution because they are not confirmed by the other tests such as the more powerful Corrado or BMP test.

Regarding the corporate governance events for all degrees of importance pooled together and events with a degree of zero, the sign test and the Wilcoxon test are significant at the 5 and 1 % levels, respectively. Again these results should be treated with caution because they are not confirmed by other tests.

7 Conclusion

In this paper, we have evaluated the effect of published news about the environmental, social or corporate governance practices of firms on bond and credit default swap prices. We find that even though negative events do not have a statistically significant effect on bond prices, they do have a slight significant negative impact on credit default swaps. Since the higher the spread of a credit default swap the higher the credit risk of the underlying, interpreting these result is challenging.

Our work is still in its preliminary stage. We are currently working on the explanation of the abnormal return. We will, for instance, differentiate the bond issuers by their leverage ratio and their ESG reputation.

Furthermore, several problems should be solved and results more deeply explained. The question of what drives the positive financial results of negative ESG news should be answered.

Due to the lack of positive events, we are however unable to draw conclusions of the impact of positive news. This lack of data on positive events could be tackled. This lack of data biases our empirical results and undermines the hypothesis on reported event exogeneity. We should also analyse the joint impact of our events on the bond market and the stock market. Do markets reacts in the same direction after publication of an event? The explanation of the observed abnormal returns could also be considered.

Table 1
Categories of events

Categories	Criteria
Environment	Development Renewable Energy
Environment	Environmental Performance
Environment	Green Investing
Environment	Environmental Strategie
Environment	Pollution
Environment	Biodiversity
Environment	Water
Social	Human Rights
Social	Health & Safety
Social	Employment Conditions
Social	Labour Relations
Social	Supply Chain & Customers
Social	Product Responsibilty
Social	Responsible Marketing
Social	Community Involvement
Governance	Board Independance
Governance	Audit & Control
Governance	Remuneration
Governance	Shareholders' Rights
Governance	Takeover Defense Measures
Governance	Ethics
Governance	Transparency And Integration Of ESG Risks

Table 2
Tests for an aggregate effect of negative ESG news on bond returns

All Events

size index	*Number*	*Min*	*Max*	*Mean*	*Median*	*Sign test*	*Wilcoxon*	*Corrado*	*BMP*	*Cumul t-test*	t_{grank}
All Events	1027	-0.03	0.05	0.0	0.0	-1.15	-0.42	0.77	0.7	1.64	-0.35
0	547	-0.02	0.06	0.0	0.0	-0.86	-0.27	1.04	0.78	1.39	-0.08
1	192	-0.01	0.02	0.0	0.0	0.29	-0.39	-0.03	1.83*	1.52	-1.28
2	23	-0.01	0.0	0.0	0.0	-	-	-	-	-	-
3	259	-0.03	0.02	0.0	0.0	-1.18	-1.53	0.43	-1.59	-0.89	1.17
4	6	0.0	0.0	0.0	0.0	-	-	-	-	-	-

Note: A Positive statistic of Corrado's test, the Grank test or Wilcoxon's test indicates that we have a significant proportion of negative abnormal returns in our sample. For the cumulative t-test and the t_{grank} the abnormal returns are cumulated over an event day period of five work days (5 daily returns) starting at the date that is stored in our database. BMP is short for Boehmer, Musumeci and Poulsen (1991). *, ** and *** mean that the abnormal return is significant at the 10 %, 5 % and 1 % levels respectively.

Table 3
Cumulative tests for an aggregate effect of negative ESG news on bond returns

All Events

size index	*Number*	*Cumul t-test, t+2*	*Cumul t-test, t+5*	$t_{grank}, t+2$	$t_{grank}, t+5$	$t_{grank}, -1, t+5$	$t_{grank}, -3, t+5$
All Events	1027	-0.51	1.64	1.28	-0.35	0.97	0.37
0	547	1.0	1.39	1.23	-0.08	1.12	-0.11
1	192	0.49	1.52	0.62	-1.28	-0.21	-0.06
2	23	-	-	-	-	-	-
3	259	-1.19	-0.89	1.28	1.17	0.29	1.41
4	6	-	-	-	-	-	-

Note: A Positive statistic of the Grank indicates that we have a significant proportion of negative abnormal returns in our sample. BMP is short for Boehmer, Musumeci and Poulsen (1991). *, ** and *** mean that the abnormal return is significant at the 10 %, 5 % and 1 % levels respectively.

Table 4
Tests by categories of negative ESG news on bond returns

Size index	*Number*	*Min*	*Max*	*Mean*	*Median*	*Sign test*	*Wilcoxon*	*Corrado*	*BMP*	*Cumul t-test*	t_{grank}
Environmental events											
All Events	506	-0.03	0.01	0.0	0.0	-0.8	-0.09	0.05	0.84	1.48	-0.78
0	192	-0.02	0.01	0.0	0.0	-0.43	0.2	0.14	0.8	0.88	-0.8
1	138	-0.01	0.02	0.0	0.0	0.85	-0.15	0.37	0.85	1.46	-1.21
2	18	-0.1	0.0	0.0	0.0	-	-	-	-	-	-
3	153	-0.03	0.01	0.0	0.0	-	-	-	-	-	-
4	5	0.0	0.0	0.0	0.0	-	-	-	-	-	-
Social events											
All Events	295	-0.01	0.01	0.0	0.0	-0.29	-1.16	1.9	-0.59	0.31	0.3
0	193	-0.01	0.01	0.0	0.0	0.22	-0.18	2.73***	-0.66	0.4	0.64
1	43	0.0	0.01	0.0	0.0	-1.37	-1.42	-0.88	2.43***	0.38	-0.51
2	5	0.0	0.0	0.0	0.0	-	-	-	-	-	-
3	53	0.0	0.01	0.0	0.0	-0.14	-1.1	-0.09	-1.75*	-0.23	0.18
4	1	0.0	0.0	0.0	0.0	-	-	-	-	-	-
Governance events											
All Events	226	0.01	0.06	0.0	0.0	-0.93	-1.3	-0.62	0.91	1.05	0.05
0	162	-0.01	0.06	0.0	0.0	-1.25	-1.4	-0.99	1.28	1.27	-0.57
1	11	0.0	0.0	0.0	0.0	-	-	-	-	-	-
2	0	-	-	-	-	-	-	-	-	-	-
3	53	0.0	0.02	0.0	0.0	-0.14	-0.77	0.26	-0.28	-0.6	1.06
4	0	-	-	-	-	-	-	-	-	-	-

Note: A Positive statistic of Corrado's test, the Grank test or Wilcoxon's test indicates that we have a significant proportion of negative abnormal returns in our sample. For the cumulative t test and the GRANK test the abnormal returns are cumulated over an event day period of five work days (5 daily returns) starting at the date that is stored in our database. BMP is short for Boehmer, Musumeci and Poulsen (1991). *, ** and *** mean that the abnormal return is significant at the 10 %, 5 % and 1 % levels respectively.

Table 5
Tests for an aggregate effect of negative ESG news on CDS returns

All Events

size index	*Number*	*Min*	*Max*	*Mean*	*Median*	*Sign test*	*Wilcoxon*	*Corrado*	*BMP*	*Cumul t-test*	t_{grank}
All Events	581	-0.43	0.2	0.0	0.0	-0.87	0.77	-0.65	-0.43	-2.72***	1.83*
0	306	-0.13	0.18	0.0	0.0	-0.46	0.86	-1.71	0.24	-1.12	0.22
1	116	-0.1	0.2	0.0	0.0	-1.11	-0.59	0.8	-0.76	-1.91*	1.14
2	13	-0.06	0.01	-0.01	0.0	0.83	0.52	0.46	-0.76	-2.14**	1.43
3	143	-0.08	0.08	0.0	0.0	-0.34	0.26	-0.22	0.05	-1.39	1.28
4	3	-0.05	-0.01	-0.03	-	-	-	-	-	-	-

Note: A Positive statistic of Corrado's test, the Grank test or Wilcoxon's test indicates that we have a significant proportion of negative abnormal returns in our sample. For the cumulative t-test and the t_{grank} the abnormal returns are cumulated over an event day period of five work days (5 daily returns) starting at the date that is stored in our database. BMP is short for Boehmer, Musumeci and Poulsen (1991). *, ** and *** mean that the abnormal return is significant at the 10 %, 5 % and 1 % levels respectively.

Table 6
Cumulative tests for an aggregate effect of negative ESG news on CDS returns

All Events

size index	*Number*	*Cumul t-test, t+2*	*Cumul t-test, t+5*	$t_{grank}, t+2$	$t_{grank}, t+5$	$t_{grank}, -1, t+5$	$t_{grank}, -3, t+5$
All Events	581	-1.19*	-2.71***	0.7	1.83*	2.35**	0.32
0	306	-0.43	-1.11	-0.33	0.22	1.3	-0.49
1	116	-1.35	-1.92*	0.68	1.14	1.87*	1.05
2	13	-1.56	-2.14**	-0.22	-1.43	0.2	0.4
3	143	0.0	-1.39	-0.95	1.28	0.95	0.27
4	3	-	-	-	-	-	-

Note: A Positive statistic of the Grank test indicates that we have a significant proportion of negative abnormal returns in our sample. BMP is short for Boehmer, Musumeci and Poulsen (1991). *, ** and *** mean that the abnormal return is significant at the 10 %, 5 % and 1 % levels respectively.

Table 7
Tests by categories of negative ESG news on CDS returns

Size index	*Number*	*Min*	*Max*	*Mean*	*Median*	*Sign test*	*Wilcoxon*	*Corrado*	*BMP*	*Cumul t-test*	t_{grank}
Environmental events											
All Events	265	-0.13	0.18	0.0	0.0	-1.17	-1.26	-0.15	0.12	-1.61	0.97
0	105	-0.13	0.18	0.0	0.0	-0.68	-1.28	-0.93	0.84	0.27	-0.94
1	73	-0.08	0.04	0.0	0.0	-0.11	-0.33	0.54	-0.49	-1.73*	0.87
2	12	-0.01	0.01	-0.01	0.0	-	-	-	-	-	-
3	73	-0.08	0.07	0.0	0.0	-1.29	-0.53	-0.29	0.36	-1.17	1.16
4	2	-0.05	-0.03	-0.04	-	-	-	-	-	-	-
Social events											
All Events	181	-0.1	0.07	0.0	0.0	-2.0	-0.24	0.03	-1.4	-1.94*	1.33
0	111	-0.06	0.04	0.0	0.0	-2.18**	-0.52	-0.56	-0.79	-1.87*	1.31
1	36	-0.1	0.05	-0.01	0.0	-1.86*	-0.66	1.02	-1.09	-0.93	0.97
2	1	0.01	0.01	-	-	-	-	-	-	-	-
3	32	-0.06	0.07	0.0	0.0	0.71	0.52	-0.23	-0.44	0.29	-0.81
4	1	-0.01	-0.01	-	-	-	-	-	-	-	-
Governance events											
All Events	133	-0.11	0.2	0.0	0.0	2.17**	2.97***	-1.38	0.62	-1.0	0.7
0	89	-0.11	0.05	0.0	0.0	2.23**	2.81***	-1.59	0.5	-0.25	-0.22
1	7	-0.02	0.2	0.03	0.0	-	-	-	-	-	-
2	0	-	-	-	-	-	-	-	-	-	-
3	37	-0.04	0.08	0.0	0.0	0.49	0.72	0.2	0.01	-1.46	1.63
4	0	-	-	-	-	-	-	-	-	-	-

Note: A positive statistic of Corrado's test, the Grank test or Wilcoxon's test indicates that we have a significant proportion of negative abnormal returns in our sample. For the cumulative t test and the GRANK test the abnormal returns are cumulated over an event day period of five work days (5 daily returns) starting at the date that is stored in our database. BMP is short for Boehmer, Musumeci and Poulsen (1991). *, ** and *** mean that the abnormal return is significant at the 10%, 5 % and 1 % levels respectively.

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