When Financial Innovation Backfires: The Effects of Credit Default Swaps on Corporate Environmental & Social Irresponsibility

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Abstract

This study documents a significant increase in both the number and severity of corporate environmental and social (E&S) incidents for firms referenced by Credit Default Swap (CDS) contracts following the initiation of CDS trading. The effect is more pronounced in firms with high debt dependence and those associated with socially responsible lenders who, post-CDS initiation, reduce their monitoring activities. Additionally, we find that socially responsible shareholders can mitigate the adverse effects of CDS trading on corporate social irresponsibility. Our analysis identifies several mechanisms through which CDS trading influences corporate behavior, including reduced creditor monitoring, increased risk-taking, and the threat of tough debt renegotiation. Our findings shed light on the unintended consequences of CDS trading on corporate governance and sustainability and underscore the importance of considering the broader externality of financial derivatives on corporate social responsibility.

Keywords: Credit Default Swaps; Empty Creditor; Environmental Irresponsibility; Social Irresponsibility; Responsible Creditors;

JEL Classification: G30; G32; M14

1 Introduction

The growing importance of Environmental, Social, and Governance (ESG) considerations in the corporate world has renewed attention to the factors influencing corporate social responsibility (CSR) and irresponsibility. Among these factors, the role of financial innovative instruments, particularly Credit Default Swaps (CDSs), has sparked significant interest and debate. CDS, a type of credit derivative that allows lenders to transfer the risk of default to another party, has been criticized for its potential to incentivize risky corporate behavior (Bolton & Oehmke, 2011; Chang et al., 2019) and to amplify corporate default risk (Bolton & Oehmke, 2011; Subrahmanyam et al., 2014; Danis & Gamba, 2018). Despite concerns about their role in the 2008 financial crisis and their implications for financial stability (Stulz, 2010), the impact of CDS trading on corporate social irresponsibility, particularly in the context of environmental and social (E&S) issues, remains largely unexplored.

Understanding the relationship between CDS trading and corporate social irresponsibility is crucial for several reasons. First, as CDS markets have expanded—with the global notional amount outstanding in CDS contracts reaching over $8 trillion by the end of 2022 (Bank for International Settlements, 2023)—the potential for these financial instruments to affect corporate behavior in ways that extend beyond traditional financial metrics has grown as well. The possibility that CDS trading could exacerbate corporate social irresponsibility has profound implications for investors, regulators, and society at large, particularly as ESG concerns become increasingly central to investment strategies. For instance, according to Bloomberg Intelligence statistics, global ESG assets under management were projected to exceed $50 trillion by 2025, representing more than a third of all global assets[1]. Moreover, investigating the effects of CDS trading on corporate social irresponsibility provides valuable insights into the broader consequences of financial innovation on corporate governance and sustainability.

CDS trading can impact corporate environmental and social irresponsibility

[1] https://www.bloomberg.com/professional/insights/trading/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/

through several channels. One primary channel is the "empty creditor" problem, where creditors, insulated from default risk by CDS protection, have less incentive to monitor the borrowing firm's behavior (Hu & Black, 2008). This reduced monitoring can lead to increased managerial discretion, potentially resulting in higher risk-taking and a greater focus on short-term financial gains at the expense of long-term ESG performance (Morrison, 2005). Another channel is the potential for tougher debt renegotiation stances by CDS-insured creditors, which can pressure firms to prioritize financial performance over socially responsible initiatives (Bolton & Oehmke, 2011). Additionally, the presence of socially responsible lenders, who might reduce their oversight when CDS protection is in place, can further amplify these negative effects (Shan et al., 2019).

We utilize a comprehensive panel dataset that spans an extended period and covers a wide cross-section of firms. The dataset includes composite quotes drawn from the Markit dataset, as used by Subrahmanyam et al. (2014), Li and Tang (2016), Subrahmanyam et al. (2017), Liu et al. (2024). To measure corporate E&S irresponsibility, we use firm-level negative E&S incidents—an event-based measure constructed by RepRisk—to represent corporate E&S irresponsible outcomes. As suggested by Li and Wu (2020), the RepRisk dataset offers two key advantages in investigating ESG issues. First, RepRisk covers 28 ESG issues and screens over 100,000 public sources and stakeholders (e.g., media, regulatory, and commercial documents) in 23 languages for ESG incidents, making it both broad and granular. Second, RepRisk evaluates firms based on realized ESG outcomes rather than relying on subjective analyst ratings and self-reported information, enabling a more frequent and objective evaluation of firms' real ESG performance. We construct two corporate E&S irresponsible measures: the total volume of E&S incidents and the aggregated impacts of E&S incidents for a firm in a year, the latter estimated as the product of severity, reach, and novelty scores for each incident. Our empirical evidence suggests that relative to non-CDS-referenced firms, CDS-referenced firms experience a 41.7% increase in the total volume of E&S incidents and a 37.3% increase in their aggregated impacts, on average, after CDS trade initiation relative to the corresponding

unconditional means in our sample. These findings are robust across a series of endogeneity and robustness tests.

Furthermore, we conduct a battery of analyses to explore the possible mechanisms through which CDSs affect borrowing firms' E&S incidents. First, we examine whether socially responsible investors influence the impact of CDSs on corporate E&S irresponsible performance. With CDS protection, empty creditors have less incentive to monitor borrowing firms (Morrison, 2005; Hu & Black, 2008; Subrahmanyam et al., 2017). Compared to conventional lenders, socially responsible lenders focus on both firms' financial performance and ESG activities. If CDSs reduce lenders' monitoring incentives, we expect this reduction to be more pronounced in firms with socially responsible lenders than in those without them. As expected, we find that CDS-referenced firms with socially responsible lenders experience an increase in corporate E&S irresponsible measures after the onset of CDS trading. Moreover, we document that the impact of CDSs on E&S incidents is less pronounced in firms with more socially responsible shareholders.

Second, if borrowing firms' ESG incidents increase due to reduced monitoring by lenders after the inception of CDS trading, we expect this influence to be more pronounced in firms that are more subject to lender monitoring in the absence of CDSs. Specifically, we use debt dependence and the presence of bank lenders to reflect the extent to which firms are subject to lender monitoring. As anticipated, we find that the impact of CDSs on corporate E&S irresponsible performance is stronger for firms with high debt dependence compared to those with low debt dependence. Additionally, we consider whether firms have bank loans to reflect lenders' monitoring behavior from a different perspective. We document that CDS-referenced firms with bank lenders experience more E&S incidents after the onset of CDS trading, supporting the argument that firms' E&S incidents increase through the lenders' monitoring channel after the inception of CDS trading.

Third, since CDS-insured empty creditors can be excessively tough in debt renegotiations (Bolton & Oehmke, 2011), borrowers may prioritize financial performance over corporate E&S performance to avoid triggering debt renegotiations.

Consequently, we expect a stronger effect of CDSs on E&S incidents in firms with a high probability of debt renegotiation. Specifically, we use default probability, cash flow volatility, and R&D investments to reflect the threat of debt renegotiation. As expected, we find a stronger effect of CDSs on E&S incidents in firms with high default probability, more volatile cash flows, and higher R&D expenses. The evidence suggests that the ex-post threat of tough CDS-insured lenders exacerbates corporate E&S irresponsible incidents.

This study contributes to the literature in at least two significant ways. First, our findings deepen the understanding of the real effects of CDS trading on corporate environmental and social performance. Prior literature documents that CDSs affect financial policies and performance, including capital structure (Saretto & Tookes, 2013), cash holdings (Subrahmanyam et al., 2017), reporting conservatism (Martin & Roychowdhury, 2015), voluntary disclosure (Kim et al., 2018), credit risk (Subrahmanyam et al., 2014), and stock price crash risk (Liu et al., 2024). Meanwhile, recent literature has begun to examine non-financial factors, such as innovation output (Chang et al., 2019), ESG ratings (Zhao & Zhu, 2024), and employee welfare ratings (Richmond et al., 2024). In this study, we present robust evidence showing an increase in both the total number and the aggregated impact of corporate E&S incidents following the introduction of CDS trading. Furthermore, we provide evidence supporting the risk-taking, external monitoring, and debt renegotiation threat channels through which CDS trading affects corporate E&S irresponsible performance.

Second, our findings enrich the literature investigating the determinants of corporate socially responsible performance. Previous studies suggest that institutional ownership (Chen et al., 2020; Azar et al., 2021), state ownership (Hsu et al., 2023), agency concerns (Ferrell et al., 2016), CEO personal attributes (Borghesi et al., 2014; Cronqvist & Yu, 2017; Hegde & Mishra, 2019), and democratic stakeholders (Di Giuli & Kostovetsky, 2014) can influence firms' engagement in socially responsible practices. By demonstrating that the inception of CDS contracts significantly impacts corporate social irresponsibility, this study underscores the influence of financial innovations in credit derivative markets on corporate social responsibility.

The remainder of the paper is organized as follows: Section 2 develops the hypotheses, Section 3 describes the sample, Section 4 presents the evidence on the effect of CDS trading on corporate E&S irresponsibility, Section 5 conducts the mechanism analyses, and Section 6 concludes.

2 Hypothesis Development

The introduction of CDS contracts generates mixed impacts on corporate social irresponsibility. On the one hand, the initiation of CDS trading possibly exacerbates corporate social irresponsibility through multiple channels. First, CDS-insured creditors are insulated from corporate default risk and have a lower incentive to engage in costly monitoring of referenced firms (Morrison, 2005; Hu & Black, 2008; Subrahmanyam et al., 2017). For instance, Shan et al. (2015) find that lenders have less strict covenants on borrowing firms' debt under CDS protection. The reduced creditor monitoring gives managers more flexibility to take an excess risk to increase anticipated equity value. For example, prior literature documents higher financial leverage (Saretto & Tookes, 2013), greater default risk (Subrahmanyam et al., 2014), and more investments in risky technological innovation (Chang et al., 2019) after the inception of CDS trading. However, prior literature shows that good socially responsible performance is generally negatively associated with corporate risk. For example, Lins et al. (2017) show that firms with high corporate social responsibility intensity suffered from less stock price declines during the 2008-2009 financial crisis. Similar findings are also documented around the world during the COVID-19 pandemic (i.e. Albuquerque et al. (2020); Broadstock et al. (2021)). Thus, an increase in risk-taking appetite after the inception of CDS trading possibly rules out low-risk, socially responsible projects. Second, CDS-insured creditors are reluctant to make concessions by accepting debt reductions or late payment in debt renegotiation (Bolton & Oehmke, 2011; Danis & Gamba, 2018), which induces a higher likelihood of bankruptcy (Subrahmanyam et al., 2014). To avoid being involved in debt renegotiation with more stringent creditors after the inception of CDS trading, referenced firms choose to hold more cash and focus on corporate short-term performance. Such a conservative

investment strategy leads to underinvestment in long-term or cash-intensive environmental and social-friendly projects. Third, CDS contracts provide an opportunity to hedge default risk for credit suppliers, such as banks, mutual funds, and investment companies. Saretto and Tookes (2013) document higher leverage ratios after the inception of CDS trading. To serve large volume of debts and keep a firm alive, the corporate manager is required to maintain financial liquidity and emphasize short-term performance, which further squeezes out long-term socially responsible projects.

On the other hand, the introduction of CDS trading could mitigate corporate social irresponsibility by lowering creditor monitoring incentives and increasing credit supplies. As aforementioned, creditors, especially banks, closely monitor corporate short-term performance to manage borrowers' credit risk, discouraging firms from investing in long-term projects to improve environmental and social performance in the long run. The credit insurance provided by buying CDS alleviates creditors' monitoring incentive. It gives managers more flexibility to invest in long-term projects to improve corporate socially responsible performance. Moreover, since creditors could buy CDS contracts to hedge borrowers' credit risk, it increases creditors' risk tolerance, relaxes regulatory capital requirements and reduces strategic default. For example, Shan et al. (2021) document a significant increase in bank assets after CDS usage. Bolton and Oehmke (2011) and Danis and Gamba (2018) show that the "ex-ante commitment benefit" provided by CDS contracts decreases borrowers' strategic propensity to default. Consistent with these findings, Saretto and Tookes (2013) document that firms tend to maintain higher leverage ratios and longer debt maturities, especially when credit constraints become binding. The increased lending activities and long-term credit supply could be used to finance long-term socially responsible projects, which might result in a decline in the frequency and impacts of corporate social irresponsible incidents.

Therefore, the effect of CDS trading on E&S incidents is an empirical research question. We construct the following competing hypothesis to examine the effects of CDSs on corporate environmental & social irresponsibility:

Hypothesis 1a: The introduction of CDS trading is positively associated with

referenced firms' environmental and social irresponsible performance.

Hypothesis 1b: The introduction of CDS trading is negatively associated with referenced firms' environmental and social irresponsible performance.

3 Data

3.1 Corporate environmental and social irresponsibility

Our primary measures for the level of corporate environmental and social irresponsibility rely on the incidents of environmental and social issues collected by RepRisk[2] from over 100,000 public sources, including print media, online media, social media, government bodies, regulators, think tanks, newsletters and other online sources, and stakeholders in 23 languages around the world[3]. RepRisk uses a combination of human intelligence and machine learning algorithms to analyze, identify and label environmental, social and governance issues and the affected firms. In contrast to ESG ratings provided by major rating agencies, such as MSCI IVA, Refinitive Asset4, S&P Trucost, etc., the incidents identified by RepRisk reflect materialized corporate social irresponsible behavior. More importantly, the well-diversified public sources and stakeholders alleviate the bias of corporate self-reported information, especially when it comes to corporate social irresponsible behavior.

RepRisk identifies and labels 6 environmental and 10 social issues, as shown in Table A in the appendix. Each incident is evaluated and scored based on severity (harshness of the incidents), reach (impacts of information source) and novelty (newness of the issues). We compose two measures to reflect corporate environmental and social irresponsible performance. The first one is the total number of E&S incidents for firm *i* in fiscal year *t*,

$$ESI\ Volume_{i,t} = log\left(\sum EI_{i,t}^{m} + \sum SI_{i,t}^{n} + 1\right)$$

[2] RepRisk is widely used in prior literature in finance, including Li and Wu (2020), Dai et al. (2021), Economidou et al. (2022), etc.

[3] https://www.reprisk.com/news-research/resources/methodology#ii-research-approach-and-scope

Where $EI_{i,t}^{m}$ is an indicator that equals one if firm *i* is affected by environmental incident *m* in year *t*, and zero otherwise. Similarly, $SI_{i,t}^{n}$ is an indicator that equals one if firm *i* is affected by social incident *n* in year *t*, and zero otherwise.

The second one is the aggregated impacts of E&S incidents for firm *i* in fiscal year *t*,

$$ESI\ Impact_{i,t} = log\left(\sum EI_{i,t}^{m} * S_{i,t}^{m} * R_{i,t}^{m} * N_{i,t}^{m} + \sum SI_{i,t}^{n} * S_{i,t}^{n} * R_{i,t}^{n} * N_{i,t}^{n} + 1\right)$$

Where $S_{i,t}^{m}$ represents the severity of incident *m* that affected firm *i* in year *t*. It equals 3, 2 and 1 for high, medium and low severity, respectively. $R_{i,t}^{m}$ represents the reach of incident *m* that affected firm *i* in year *t*. It equals 2 and 1 for international and local media, respectively. $N_{i,t}^{m}$ represents the novelty of incident *m* that affected firm *i* in year *t*. It equals 2 if the incident is released for the first time and 1 if not. We set both $ESI\ Volume_{i,t}$ and $ESI\ Impact_{i,t}$ to zero if there is no environmental or social incident affecting firm *i* in year *t*.

As reported in Table 1, there are approximately 0.326 E&S incidents per firm on average in our sample. While for CDS-referenced firms, the average volume of E&S incidents is much greater, about 0.708. Similar pattern exists for the E&S impacts between all firms and CDS-referenced firms.

[Please Insert Table 1 about Here]

3.2 Credit Default Swap

Following prior literature, we identify single-name CDS information from Markit to compose our sample in the United States[4]. We identify the inception of CDS trading as the first day on which we observed CDS quotes in the Markit dataset[5]. Particularly, we introduce an indicator, denoted by $CDS\ Active_{i,t}$, that equals one after the inception of CDS activities referenced on firm *i* and zero otherwise. Moreover, we use the total

[4] Subrahmanyam et al. (2014), Shan et al. (2019), Chang et al. (2019) and Liu et al. (2024) use the Markit dataset to investigate CDS markets.

[5] Markit started to provide CDS quote data in 2001.

number of distinct financial institutions that provide valid CDS quotes on a CDS contract in a fiscal year to reflect the endogenous liquidity of CDS trading, denoted by *CDS Quotes*$_{i,t}$. After merging with other databases, we restrict our sample period from 2007 to 2022 as RepRisk started to provide E&S incidents data from 2007.

3.3 Other variables

We extract corporate fundamental information from COMPUSTAT, stock market data from CRSP, ownership information from Refinitiv, and macroeconomic data from the Federal Reserve Board. After merging the above datasets, we obtain a sample with 31,492 firm-year observations, 2,946 distinct firms, and 789 CDS-referenced firms during the 2007-2022 period. We winsorize at the 2% level in both tails for continuous variables to alleviate the impact of outliers. Table 1 reports the descriptive statistics of interest and control variables. We find that, on average, CDS-referenced firms have larger size, higher financial leverage, less cash and lower Tobin Q, which are consistent with the descriptive statistics in related literature (i.e. Shan et al. (2019); Chen et al. (2023); Liu et al. (2024)). Appendix C provides detailed descriptions of the variables.

4 Does CDS Trading Affect Corporate Environmental and Social Irresponsibility?

4.1 The effects of CDS trading on corporate E&S irresponsibility

To examine the effect of CDS trading on corporate social irresponsibility, we construct a regression model as follows,

$$ESI_{i,t} = \alpha + \beta_1 CDS\ active_{i,t-1} + \delta X_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where $ESI_{i,t}$ represents corporate social irresponsible measures. Specifically, we use the total number of E&S incidents (*ESI Volume*$_{i,t}$) and the aggregated impacts of E&S incidents (*ESI Impact*$_{i,t}$) as two primary measures. *CDS active*$_{i,t-1}$ is an indicator that equals one after the introduction of CDS contracts referenced on firm *i*, and zero otherwise. Following prior studies (Subrahmanyam et al., 2014; Liu et al., 2024), we identify the inception year of a CDS contract as the first year in which we observed CDS quotes in the Markit dataset.

To isolate the impact of CDS trading from known determinants of corporate social irresponsibility, we include a vector of control variables, denoted by $X_{i,t-1}$. Specifically, since liquid option markets could influence firms' attitudes towards E&S activities (Li et al., 2024), we include a firm's options trading activity, denoted by *Option active*$_{i,t-1}$. We control for firm fundamental characteristics (e.g., Ferrell et al. (2016)), including the logarithm of total assets (*Size*$_{i,t-1}$), the ratio of cash and cash equivalent to total assets (*Cash*$_{i,t-1}$), the ratio of capital expenditure to total assets (*CapEx*$_{i,t-1}$), the ratio of dividend payout to sales revenue (*Dividend payout*$_{i,t-1}$), the ratio of long-term debt to total assets (*Leverage*$_{i,t-1}$), market valuation indicator (*Tobin's Q*$_{i,t-1}$), profitability (*ROA*$_{i,t-1}$), the ratio of current assets to current liabilities (*Current ratio*$_{i,t-1}$), and the ownership of the largest shareholder (*Largest IO*$_{i,t-1}$). We further control for the macroeconomic factors, including the difference between Moody's Baa and Aaa corporate bond yield index (*Credit spread*$_{i,t-1}$), the value-weighted stock market return in a year (*Market return*$_{i,t-1}$), the yield on U.S. 5-year treasury securities (*Risk-free rate*$_{i,t-1}$). In addition, we incorporate firm and year-fixed effects to capture the effect of other unobservable variables and cluster the standard errors by firm. Detailed definitions of all variables are reported in Appendix C.

As shown in columns (1) and (2) in Table 2, we document significantly positive coefficients of *CDS active*$_{i,t-1}$ using both *ESI* measures, which suggests a positive relationship between CDS trading and corporate E&S irresponsible performance. Economically, the total number (*ESI Volume*$_{i,t}$) and the aggregated impacts (*ESI Impact*$_{i,t}$) of corporate E&S irresponsible incidents increase by about 41.7% (0.136/0.326=0.417) and 37.3% (0.205/0.549=0.373) after the inception of CDS trading relative to the corresponding unconditional means in our sample, respectively. Then, we incorporate industry-fixed effect in columns (3) and (4) and document consistently similar results. These findings support the argument in Hypothesis 1a.

As aforementioned, our sample starts in 2007 because Reprisk began collecting E&S incident data in 2007. There are 604 firms that started CDS trading before 2007. CDS trading indicators for these firms are always equal to one. To alleviate the impact of these CDS-referenced firms, we remove CDS-referenced firms that have CDS

activities before 2007 and rerun our baseline regression. As reported in columns (5) and (6), we consistently document a significantly positive effect of CDS trading on corporate *ESI* measures. Moreover, the Big Bang Protocol was introduced to standardize CDS contracts in April 2009, which induced a structural change in the CDS market, such as improving market liquidity (JPMorgan, 2009; Wang et al., 2021). We use the sample period after the CDS Big Bang and find consistent results, which are reported in columns (7) and (8) in Table 2. Additionally, it is possible that CDS contracts are introduced for firms without outstanding debt. There will not be an empty creditor problem if a firm has no creditors. To mitigate such impact, we use the firms with outstanding debt during our sample period to rerun the regression in model (1) and document a consistently significant positive relationship between CDS trading indicators and corporate E&S irresponsible performance measures, which are reported in columns (9) and (10) in Table 2.

For control variables, we document a negative relationship between the option trading indicator (*Option active*$_{i,t-1}$) and corporate E&S irresponsible measures, suggesting an improvement of E&S performance in the presence of options trading, which is consistent with the findings in Li et al. (2024). Moreover, we find that corporate E&S irresponsible measures are positively related to firm size and market valuation, and negatively related to firm profitability.

[Please insert Table 2 about here]

4.2 Dynamic effect analysis

To further understand the dynamic effects of CDS trading on corporate social irresponsibility, we employ seven variables, $Before^3$, $Before^2$, $Before^1$, $Current$, $After^1$, $After^2$, $After^3$ to replace *CDS active*$_{i,t-1}$ in model (1). $Current$ indicates the year in which CDS trading was initiated for CDS-referenced firms. $Before^j$ ($After^j$) indicates the j^{th} year before (after) $Current$, and zero otherwise. As shown in Table 3, we document statistically insignificant coefficients of $Before^3$, $Before^2$, and $Current$, while statistically significant positive coefficients of $After^1$,

$After^2$, $After^3$ at the conventional level for both *ESI* measures. This dynamic effect is also plotted in Figure 1. These results suggest that the significantly positive effect of CDS contracts on corporate irresponsible performance starts one year after the introduction of CDS trading, further supporting the arguments in Hypotheses 1a.

[Please insert Table 3 and Figure 1 about here]

4.3 Robustness Analysis: Alternative measures and additional controls

We perform a battery of exercises by using alternative measures and additional control variables to check the robustness of the positive relationship between CDS trading and corporate social irresponsibility.

Alternative measures

We employ three alternative measures for corporate E&S irresponsible performance to check the robustness. First, E&S incidents may be more common in some industries, such as mining, fossil fuel, etc., compared with others due to the nature of business models. To alleviate the impact of heterogeneity across industries, we construct two measures, *ESII Volume* and *ESII Impact*. *ESII Volume (ESII Impact)* is the logarithm of the difference between the firm-level number (impacts) of E&S incidents and the average number (impacts) of E&S incidents within an industry in a year. As shown in columns (1) and (2) in Panel A Table 4, we consistently document a significantly positive effect of CDS activities on referenced firms' E&S irresponsible performance. Second, we use an indicator for the presence of environmental or social incidents for a firm in a year, denoted by *ESI Dummy*. Specifically, *ESI Dummy* equals one if a firm has at least one environmental or social incident in a year, and zero otherwise. Using *ESI Dummy* as an alternative measure for corporate E&S irresponsibility, we document consistent results as reported in column (3) in Panel A Table 4. Last, we employ an alternative database, MSCI KLD Stats Database, to construct a measure for corporate E&S irresponsibility. Following Servaes and Tamayo (2013) and Lins et al. (2017), we focus on the concerns (negative ratings) in community, diversity, employee relations, environment, and human rights categories. We scale the

negative rating for each category by dividing the number of concerns for each firm-year by the maximum number of concerns for that category within an industry in a year and then sum them up to reflect the aggregated corporate E&S concerns. As expected, we obtain a consistently positive effect of CDS trading on corporate E&S concerns in column (4) in Panel A Table 4.

Next, we use the total number of financial institutions that provide distinct CDS quotes, denoted by *CDS quotes*, as an alternative proxy for CDS activities to check the robustness. This measure is interpreted as endogenous liquidity of CDS contracts (Qiu & Yu, 2012). Higher endogenous liquidity in the credit derivative market reduces transaction costs, which facilitates CDS trading (Saretto & Tookes, 2013). We use *CDS quotes* to replace *CDS active* and rerun regression in model (1). The regression results are reported in columns (5) and (6) in Panel A Table 4. We document a consistently positive relationship between the endogenous liquidity of CDS and corporate E&S irresponsibility, which further strengthens the argument in Hypothesis 1a.

Additional control variables

First, it is possible that corporate past E&S irresponsible performance can influence both current E&S performance and the likelihood of introducing CDS contracts. We incorporate corporate past E&S irresponsible performance measures as additional control variables, denoted by *PESI Volume* and *PESI Impact*, which are the rolling average of the total number and aggregate impacts of E&S incidents in the previous five years, respectively. Second, corporate governance can also affect a firm's E&S irresponsible performance and the likelihood of initiating CDS trading. To alleviate the impact of corporate governance, we added CEO age (*CEO age*) and board size (*Board size*). Prior literature shows that borrowers' E&S activities (Hsu et al., 2023) and lenders' hedging needs with CDS (Chang et al., 2019) are affected by board size. Serfling (2014) shows that CEO age significantly affects corporate risk-taking behavior. As shown in Panel B of Table 4, we remain to document positive and significant coefficients of $CDS\ active_{i,t-1}$ at the conventional level after including these control variables, which further strengthens our main findings that corporate E&S irresponsible

incidents increase after the inception of CDS trading on their debts.

[Please insert Table 4 about here]

4.4 Endogeneity analyses

Propensity score matching

It is possible that corporate future E&S irresponsible performance and the likelihood of CDS trading might be driven by some unobserved factors. We employ propensity score matching approach to alleviate such omitted variable concern. We match each CDS-referenced firm (Treated) with non-CDS-referenced firms (Control) with the closest propensity scores. Specifically, we first estimate a probit model below to regress borrowers' characteristics on the probability of initiating CDS trading. Following Subrahmanyam et al. (2014) and Chang et al. (2019), we exclude post-inception years of CDS-referenced firms.

$$Prob\big(CDS\ firm_{i,t} = 1\big) = \Phi(\alpha + \beta Y_{i,t-1} + \varepsilon_{i,t}) \quad (2)$$

where Φ is the cumulative distribution function of the standard normal distribution. $Y_{i,t-1}$ represents a set of borrowers' characteristics, including all control variables in model (1). We estimate the predicted probability of CDS trading with the propensity score calculated as $\Phi^{-1}(p)$. For each CDS-referenced firm, we locate two matched non-CDS-referenced firms with closest propensity scores. Panel A in Table 5 reports the comparison of firm-level characteristics between CDS-referenced firms and matched non-CDS-referenced firms. After matching, there are no significant differences between the treated and control groups in terms of firm-level characteristics. Further, the treated and control groups also have a similar likelihood of introducing CDS contracts after matching.

Next, we use the treated and control groups to reperform the regression in model (1). As shown in Panel B Table 5, the coefficients of $CDS\ active_{i,t-1}$ are positive and statistically significant at the 1% level for both E&S irresponsible performance measures. This evidence further supports the argument in Hypothesis 1a.

[Please insert Table 5 about here]

The instrumental variable approach

It is also likely that the expectation of higher E&S incidents in the future induces the inception of CDS trading to hedge the downside risk, which raises reverse causality concerns. We use instrumental variables approaches to check the robustness of our baseline findings after addressing such reverse causality concern. Following prior studies[6], we employ lenders' hedging activities on foreign exchange and lenders' preference for the usage of CDSs as instrumental variables.

First, Minton et al. (2008) show that the banks that hedge their risk with foreign exchange derivatives prefer to hedge credit risk with CDS contracts. In this vein, lenders' hedging preference on foreign exchange can affect the likelihood of introducing CDS contracts, which satisfy the relevant condition. Meanwhile, lenders' preference for hedging foreign exchange is unlikely to directly influence borrowing firms' ESG activities, which satisfies the exclusion condition. Particularly, we measure lenders' hedging preference on foreign exchange (*FX Hedge*) as the maximum amount of foreign exchange derivatives a firm's lender uses for hedging purposes relative to the lender's total assets across all lenders for the firm over the previous five years. The second instrumental variable is lenders' CDS preference measure, denoted by *CDS Borrowers*, which is the maximum value of all lenders' CDS preference measure of a firm from the perspective of borrowers' CDS-referenced status. A lender's CDS preference measure is the ratio of a lender's CDS-referenced borrowers to the total number of borrowers who borrowed money from the lender in the previous five years. Since lender's preference for CDS-referenced borrowers increases the demands for new borrowers' CDS trading, it should affect the likelihood of introducing CDS contracts referencing new borrowers, which satisfies the relevant condition. Meanwhile, lenders' preference for the use of CDSs is unlikely to directly influence new borrowers' E&S irresponsible performance, satisfying the exclusion condition.

We conduct a two-stage regression following Adams et al. (2009) using these

[6] For example, Saretto and Tookes (2013), Subrahmanyam et al. (2014), Chang et al. (2019), and Liu et al. (2024).

instrumental variables. Specifically, in the first stage, we examine the relationship between instrumental variables and the likelihood of CDS trading using a probit regression model. We document significantly positive coefficients of $FX\ Hedge_{i,t-1}$ and $CDS\ borrower_{i,t-1}$ in Panel A Table 6, suggesting that these instrumental variables meet the relevance condition[7]. In the second stage, we use the predicted likelihood of introducing CDS trading from the first stage to replace $CDS\ active_{i,t-1}$ and rerun regression model (1). The regression results are reported in Panel B Table 6. We document statistically significant coefficients of $Instrumented\ CDS\ active_{i,t-1}$ for both E&S irresponsible performance measures, which further adds credence to our main findings.

[Please insert Table 6 about here]

Placebo tests

It is also possible that an increase in corporate E&S incidents is driven by unobserved confounding events or factors rather than the inception of CDS trading. To alleviate such concern, we conduct placebo tests by randomly allocating "wrong" CDS-referenced and non-CDS-referenced indicators among firms. If an increase in borrowers' E&S incidents is driven by the inception of CDS trading, we expect to observe insignificant results when performing the regression model (1) with the "wrong" indicators. We repeat 1000 times and report the distribution of *t*-statistics of $CDS\ active_{i,t-1}$ in Figure 2. We find that the distribution of *t*-statistics estimates is centered around zero for both E&S irresponsibility measures. As shown in Figure 2, there is more than a 96% chance that the positive relationship between CDS trading indicators and corporate E&S irresponsible performance measures is statistically insignificant at the conventional level. This evidence suggests that an increase in corporate E&S incidents is less likely to be driven by the unobserved confounding factors, which provides further support to the argument in Hypothesis 1a.

[7] The chi-square test for weak instruments rejects the weak instrument hypothesis. The untabulated results are available upon request.

[Please insert Figure 2 about here]

5 Further Analysis

Previous analysis documents that both the total number and the aggregated impacts of corporate E&S irresponsible incidents significantly increase after the introduction of CDS contracts. In this section, we investigate the possible mechanisms through which CDS trading affects corporate E&S irresponsible performance.

5.1 Responsible creditors and shareholders

Socially responsible creditors have greater ethical responsibility and pay attention to both corporate financial performance and E&S activities, while conventional creditors mainly focus on financial performance. As aforementioned, the insured-creditors by buying CDS contracts transfer credit risk to CDS sellers while remain control rights. The separation of cash flow rights and control rights will turn the lenders into "empty creditors" (Hu & Black, 2008; Bolton & Oehmke, 2011; Shan et al., 2019) who have less incentive to monitor CDS-referenced firms (Morrison, 2005; Hu & Black, 2008; Subrahmanyam et al., 2017). The absence of socially responsible investors' monitoring in the presence of CDS trading can exacerbate the positive impact of CDS trading on corporate E&S irresponsible measures.

To examine this conjecture, we first identify corporate lenders of syndicated loans using the Dealscan dataset. We define responsible creditors as lenders who have signed the Equator Principles (EP) or Principles for Responsible Investment (PRI) [8]. *Responsible Creditor*$_{i,t-1}$ equals one for a firm when there is more than one socially responsible creditor in year *t-1*, and zero otherwise. As reported in Panel A Table 7, we document significantly positive coefficients for the interaction term between *CDS active*$_{i,t-1}$ and *Responsible Creditor*$_{i,t-1}$ in both regressions, while the coefficients of *CDS active*$_{i,t-1}$ become to be insignificant at the conventional level. This evidence suggests

[8] The signatories of equator principles are extracted from https://equator-principles.com/about-the-equator-principles/. The signatories of PRI are extracted from https://www.unpri.org/.

that an increase in corporate E&S irresponsible incidents is more pronounced in the presence of empty socially responsible creditors after the introduction of CDS trading.

Further, similarly to socially responsible creditors, socially responsible shareholders also closely monitor corporate financial performance and E&S activities. Thereby, the presence of responsible shareholders might be able to fill the external monitoring void due to the absence of socially responsible creditors after the inception of CDS trading. If this conjecture is valid, we expect that the presence of responsible shareholders moderates the impact of CDS trading on corporate E&S irresponsible measures. Empirically, we define socially responsible shareholders as institutional investors who have signed the PRI. We calculate the percentage of shares held by responsible shareholders. Since the ownership of responsible shareholders is positively associated with their voice and monitoring incentives on corporate socially responsible performance, we split our sample into two subsamples according to the median of socially responsible institutional ownership. We define $Responsible\ shareholder_{i,t-1}$ as one for a firm that falls into subsample with above the median in year *t-1* and zero otherwise. Panel B Table 7 reports the regression results after interacting $Responsible\ shareholder_{i,t-1}$ with $CDS\ active_{i,t-1}$, in the baseline regression model (1). As expected, we document a significant and negative coefficient of $Responsible\ shareholder_{i,t-1}$, suggesting the ownership of responsible shareholders is negatively associated with the number of future corporate E&S incidents. More importantly, we document significantly negative coefficients for the interaction term between $CDS\ active_{i,t-1}$ and $Responsible\ shareholder_{i,t-1}$ in both regressions. These findings support our conjecture that responsible shareholders alleviate the positive impact of empty responsible creditors on corporate socially irresponsible performance.

[Please insert Table 7 about here]

5.2 Creditor monitoring intensity

If a deterioration of borrowers' E&S responsible performance is due to a decline in creditors' monitoring intensity after the inception of CDS trading, we expect such

influence to be more pronounced in the firms that are more likely to be closely monitored by creditors in the absence of CDS contracts. We employ corporate debt dependence and the presence of bank lenders to proxy for the intensity of creditor monitoring.

Following Rajan and Zingales (1998) and Chang et al. (2019), we measure debt dependence as the sum of net debts divided by the sum of capital expenditures and R&D expenses over the previous five years. Creditors would monitor the firm with higher debt dependence more intensively to protect their investments. Thus, a decline in creditor monitoring intensity is more pronounced among firms with a high level of debt dependence compared with those with a low level of debt dependence. We split our sample into two subsamples, high- and low-debt-dependence groups, according to the median of the debt dependence measure. We introduce an indicator, *Debt dependence*$_{i,t-1}$, that equals one for the firms that fall into the high-debt-dependence group in year *t-1*, and zero otherwise. Panel A in Table 8 reports the regression results after interacting with *CDS active*$_{i,t-1}$ in the regression model (1). We document significant and positive coefficients for the interaction term in both regressions, which supports our conjecture that the positive impact of CDS trading on corporate E&S irresponsible measures is strengthened in firms with a high level of debt dependence.

Alternatively, we use the presence of bank lenders to indicate a higher monitoring intensity. Prior literature shows that banks are more likely to continuously monitor borrowers compared with public debtholders (Atanassov, 2016; Chang et al., 2019). Thus, firms with bank lenders are expected to receive higher monitoring intensity than those without bank lenders in the absence of CDS contracts. After the inception of CDS trading, bank lenders tend to buy CDS insurance to reduce the intensity of costly monitoring, which results in a more pronounced impact on corporate E&S irresponsibility. We pull bank lenders' information from Dealscan and report the results in Panel B Table 8. Consistent with our conjecture, we document positive and significant coefficients for the interaction term between *CDS active*$_{i,t-1}$ and *Bank lender*$_{i,t-1}$ in both regressions. This evidence further supports the creditor monitoring channel through which the introduction of CDS trading affects corporate E&S

irresponsibility.

[Please insert Table 8 about here]

5.3 Debt renegotiation threat

The empty creditors who are insured from credit risk by buying CDS contracts have a higher tendency to push for default in debt renegotiation (Bolton & Oehmke, 2011). Note that the likelihood of debt renegotiation is mostly triggered by financial performance, such as profitability, cash flow, etc., rather than corporate environmental or social issues. After the inception of CDS trading, the referenced firms' managers would try to avoid renegotiation with tough empty creditors by focusing on short-term financial performance and ignoring corporate E&S performance. Thus, we expect a stronger effect of CDS trading on E&S irresponsible issues for firms with greater debt renegotiation threats. We employ three measures to reflect the threat of debt renegotiation.

First, we use the means of expected default probability of a firm in the previous three years to reflect the threat of debt renegotiation threat. The higher expected default probability is associated with a greater threat of involving in debt renegotiation. The expected default probability is estimated based on the Merton distance to default model (Bharath & Shumway, 2008). We divide the full sample into high- and low-default probability groups according to the sample median of the 3-year average default probability. *Default probability*$_{i,t-1}$ is an indicator that equals one for firms that fall into the high-default probability group, and zero otherwise. As reported in Panel A Table 9, the coefficients of the interaction term between *CDS active*$_{i,t-1}$ and *Default probability*$_{i,t-1}$ are positive and statistically significant at the conventional level for both E&S incidents measures, which supports the argument that the impact of CDS trading on E&S irresponsible incidents is more pronounced in firms with a greater threat of debt renegotiation.

Second, we use cash flow volatility to reflect debt renegotiation threats from the cash-flow aspect. High cash flow volatility indicates a higher probability of internal

cash flow shortfalls, suggesting a greater threat of debt renegotiation. We compute corporate cash flow volatility as the standard deviation of the free cash flow ratio in the previous five years. Similarly, we split the full sample into two subsamples according to the median of the free cash flow ratio standard deviation. *Cash flow volatility*$_{i,t-1}$ equals one for firms that fall into the high cash flow volatility group in year *t-1*, and zero otherwise. We document significant and positive coefficients for the interaction term between *CDS active*$_{i,t-1}$ and *Cash flow volatility*$_{i,t-1}$ at the conventional level in both regressions. This evidence suggests that a greater threat of debt renegotiation due to cash flow volatility strengthens the positive impact of CDS trading on corporate E&S irresponsible measures.

Last, we measure the threat of debt renegotiation from the investment aspect. Prior literature shows that investments in research and development (R&D) are risky because the uncertainty of technological innovation is high, especially in the early stage (Chang et al., 2019). A failure in R&D investment might lead to financial distress, which amplifies the threat of debt renegotiation. Empirically, we use the average R&D expense, scaled by sales revenue, in the previous three years to measure corporate innovation investments. We split our sample into two subsamples according to the median of innovation investments. $R\&D_{i,t-1}$ equals one when a firm falls into the high R&D group, and zero otherwise. Panel C of Table 9 reports the regression results. Consistent with our expectation, we document significant and positive coefficients for the interaction term between *CDS active*$_{i,t-1}$ and $R\&D_{i,t-1}$ at the conventional level in both regressions. This evidence further supports the debt renegotiation threat channel through which CDS trading affects corporate E&S irresponsible performance.

[Please insert Table 9 about here]

5.4 Corporate environmental and social performance

To maintain good environmental and social performance, a firm has to allocate lots of resources to corporate socially responsible projects (Bhandari & Javakhadze, 2017).

As aforementioned, the inception of CDS trading reduces responsible creditors' monitoring incentives and forces managers to focus on short-term financial performance to avoid tough debt renegotiation, which results in a decline in the resources allocated to E&S responsible projects. Such impacts would be more pronounced for the firms that used to allocate more resources into E&S responsible projects to maintain a higher E&S scores. Thereby, we expect a more prone impact of CDS trading on corporate E&S irresponsible performance.

To examine this conjecture, we employ corporate E&S scores, denoted by $ES_{i,t-1}$, pulled from MSCI KLD, Refinitiv Asset4 and MSCI IVA datasets, respectively, to reflect E&S performance. The detailed definitions of E&S scores in these datasets are reported in Appendix C. We incorporate $ES_{i,t-1}$ into the baseline regression model (1) by interacting with *CDS Active*$_{i,t-1}$ and report the regression results in Table 10. We document significant and positive coefficients for the interaction term in all regressions, which supports our conjecture that the positive impact of CDS trading on corporate E&S irresponsible performance is more pronounced in firms with good E&S performance.

[Please insert Table 10 about here]

5.5 Demystifying the effect of CDS trading on E&S issues

In previous sections, we document significant positive impacts of CDS trading on the intensity and aggregated severity of corporate E&S irresponsible performance. To demystify the effect of CDS trading on specific environmental and social issues, we break down all E&S incidents into 6 environmental and 10 social issues[9]. Specifically, environmental issues (*EI*) include the issues on climate change, GHG emissions, and global pollution (*Climate change*), local pollution (*Pollution*), the impacts on landscapes, ecosystems, and biodiversity (*Ecosystem*), overuse and wasting of

[9] Four of the 16 issues, including overuse and wasting of resources (*Overuse*), animal mistreatment (*Animal mistreatment*), local participation (*Participation*), and child labor (*Child labor*), are not involved in our sample. Therefore, we examine the effect of CDS trading on 12 issues.

resources (*Overuse*), waste (*Waste*), and animal mistreatment (*Animal mistreatment*). Social issues (*SI*) include the issues on human rights abuses and corporate complicity (*Human right*), the impacts on communities (*Community*), local participation (*Participation*), social discrimination (*Social discrimination*), forced labor (*Forced labor*), child labor (*Child labor*), freedom of association and collective bargaining (*Freedom association*), discrimination in employment (*Employment discrimination*), occupational health and safety (*Occupational health*), and poor employment conditions (*Employment condition*).

We use the logarithm of one plus the total number of incidents on each issue for firm *i* in fiscal year *t* as dependent variables to examine the effects of CDS trading on specific E&S issues and report the regression results in Table 11. We document a significant positive relationship between $CDS\ active_{i,t-1}$ and the total number of environmental and social incidents, respectively. Moreover, for environmental issues, we find that the impact of CDS trading on the issues related to climate change, GHG emissions, global and local pollution are more pronounced. While for social issues, we find that the total number of irresponsible issues related to human right, forced labor, freedom association and employment discrimination significantly increase after the introduction of CDS trading.

[Please insert Table 11 about here]

6 Conclusion

This study provides substantial evidence on the impact of Credit Default Swap (CDS) trading on corporate social irresponsibility, particularly in the context of environmental and social (E&S) issues. Our findings indicate that the initiation of CDS trading significantly increases both the volume and impact of negative E&S incidents for firms. This effect is more pronounced in firms with high debt dependence and those associated with socially responsible lenders who, after the initiation of CDS trading, tend to reduce their monitoring activities. The study also highlights that the presence of responsible shareholders can mitigate the adverse effects of CDS trading on corporate

social irresponsibility.

Our findings generate immediate implications for investors, regulators, and corporate managers. First, understanding the potential increase in corporate social irresponsibility linked to CDS trading can guide more informed investment decisions, particularly for those prioritizing environmental, social, and governance (ESG) criteria. Second, regulators may consider these findings to evaluate the broader impacts of CDS markets on corporate behavior, possibly leading to enhanced regulatory oversight to ensure that the potential negative externalities of CDS trading are mitigated. Last but not least, for corporate managers, especially in firms with high debt dependence, the study suggests a need for stronger internal governance mechanisms to counterbalance the reduced external monitoring resulting from CDS trading.

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Appendix A: The Environmental and Social Issues Covered by RepRisk

This table reports the distribution of incidents across various environmental and social issues. Our sample period spans from 2007 to 2022. The average severity is the means of severity level of all incidents related to a topic. The average reach is the mean of the influence measure of all incidents related to a topic. The average novelty is the mean of the novelty of all incidents related to a topic.

Category	Topics	# of Incidents	Average Severity	Average Reach	Average Novelty
Environment	Climate change, GHG emissions, and global pollution (*Climate change*)	6168	1.369	1.584	1.429
	Local pollution (*Pollution*)	10798	1.414	1.597	1.336
	Impacts on landscapes, ecosystems, and biodiversity (*Ecosystem*)	12579	1.426	1.583	1.388
	Overuse and wasting of resources (*Overuse*)	908	1.494	1.575	1.604
	Waste issues (*Waste*)	3486	1.435	1.589	1.435
	Animal mistreatment (*Animal mistreatment*)	968	1.182	1.789	1.365
Social	Human rights abuses and corporate complicity (*Human right*)	11246	1.465	1.759	1.450
	Impacts on communities (*Community*)	14305	1.440	1.596	1.373
	Local participation issues (*Participation*)	1860	1.477	1.502	1.597
	Social discrimination (*Social discrimination*)	1398	1.187	2.057	1.406
	Forced labor (*Forced labor*)	2095	1.665	1.627	1.528
	Child labor (*Child labor*)	1288	1.727	1.623	1.523
	Freedom of association and collective bargaining (*Freedom association*)	1848	1.527	1.598	1.520
	Discrimination in employment (*Employment discrimination*)	2945	1.393	1.757	1.465
	Occupational health and safety issues (*Occupational health*)	5693	1.452	1.725	1.393
	Poor employment conditions (*Employment condition*)	7228	1.443	1.683	1.445

Appendix B: Descriptive Statistics by Year

This table reports the distribution of observations by year. # of new CDS contracts refers to the total number of new CDS trading initiated in a year. % of Obs. with ESI refers to the percentage of observations with one or more than one E&S incidents documented by RepRisk dataset. The definition of ESI Volume (Impact) is in Appendix C.

Year	# of Obs.	# of new CDS contracts	% of Obs. with ESI	Mean of ESI Volume	Mean of ESG Impacts
Before 2007		604			
2007	1959	33	0.092	0.100	0.200
2008	2065	43	0.173	0.210	0.399
2009	2043	10	0.150	0.173	0.317
2010	2038	13	0.164	0.197	0.374
2011	2048	5	0.202	0.257	0.438
2012	2015	11	0.239	0.299	0.507
2013	2025	12	0.255	0.329	0.546
2014	2055	1	0.281	0.381	0.632
2015	2091	3	0.290	0.368	0.623
2016	2036	8	0.270	0.326	0.547
2017	1983	4	0.290	0.376	0.608
2018	1933	11	0.305	0.403	0.660
2019	1893	11	0.385	0.503	0.850
2020	1846	5	0.345	0.463	0.739
2021	1795	7	0.327	0.441	0.714
2022	1667	8	0.338	0.441	0.719
Total	31492	789	0.254	0.326	0.549

Appendix C: Variable Definitions

Derivatives variables	
CDS active	An indicator that equals one after the inception of CDS trading for a firm, and zero otherwise. Source: Markit, CreditTrade, GFI Group.
CDS quote	The mean of *daily CDS quote* within a fiscal year. *Daily CDS quote* is the total number of distinct financial institutions that provide valid CDS quotes on a CDS contract. Source: Markit.
Option active	An indicator that equals one after the inception of option trading for a firm, and zero otherwise. Source: OptionMetrics LLC.
ESG variables	
ES Asset4	The average between environmental and social pillar scores. Source: Thomson Reuter's Refinitiv ESG database.
ES concern	The sum of the indicators of firms' community, diversity, employee relations, environment, and human rights concerns. We scale the concerns for each category by dividing the number of concerns for each firm-year by the maximum number of concerns for that category within an industry in a year. Source: MSCI KLD Stats database.
ESI Dummy	An indicator that equals one if a firm has at least one environmental or social incident in a year, and zero otherwise. Source: RepRisk dataset.
ES IVA	The average between environmental and social pillar scores. Source: MSCI's Intangible Value Assessment database.
ES KLD	The sum of the indicators of firms' community, diversity, employee relations, environment, and human rights performance. We scale the strengths (concerns) for each category by dividing the number of strengths (concerns) for each firm-year by the maximum number of strengths (concerns) for that category within an industry in a year and then subtract the concerns index from the strengths index. Source: MSCI KLD Stats database.
ESI Volume	The logarithm of one plus total E&S incidents amounts. Source: RepRisk dataset.
ESI Impact	The logarithm of one plus total E&S incidents impact, which is estimated as the product of severity, reach, and novelty for each incident. The severity score ranges from 1 to 3. A higher score indicates greater severity. The reach score ranges from 1 to 2. A higher reach score indicates international influence of the media, while low score indicates local influence of the media. The novelty score ranges from 1 to 2. A higher novelty score indicates the first time to report an incident by public media, while lower score indicates repeated reporting. Source: RepRisk dataset.
ESII Volume	The difference between firm-level *ESI Volume* and the average of *ESI Volume* within an industry in a year. Source: RepRisk dataset.
ESII Impact	The difference between firm-level *ESI Impact* and the average of *ESI Impact* within an industry in a year. Source: RepRisk dataset.
PESI Volume	The rolling average of the logarithm of one plus total E&S incidents amount in the previous five years. Source: RepRisk dataset.
PESI Impact	The rolling average of the logarithm of one plus total E&S incidents impact in the previous five years. Source: RepRisk dataset.
Other firm variables	
Bank lender	An indicator that equals one when a firm borrow from banks, and zero otherwise. Source: DealScan.
Board size	The natural logarithm of the number of board members. Source: BoardEx.
CapEx	The ratio of capital expenditure to total assets. Source: COMPUSTAT.

Cash	The ratio of cash and cash equivalent to total assets. Source: COMPUSTAT.
Cash flow volatility	An indicator that equals one for a firm that falls into high-cash-flow-volatility group, and zero otherwise. Cash flow volatility is estimated as the standard deviation of free cash flow over the past five years. Free cash flow is the difference between the ratio of free cash flow to total assets and the year average. We split our sample into two groups according to the median of cash flow volatility. Source: COMPUSTAT.
CDS borrower	The maximum value of all lenders' CDS preference measure of a firm. A lender's CDS preference measure is the ratio of a lender's CDS-referenced borrowers to the total number of borrowers who borrowed money from the lender in the previous five years. Source: Markit, CreditTrade, GFI Group, and DealScan.
CEO age	The natural logarithm of the age of a firm's CEO. Source: ExecuComp.
Current ratio	The ratio of current assets to current liabilities. Source: COMPUSTAT.
Debt dependence	An indicator that equals one for a firm that falls into the group with high debt dependence, and zero otherwise. Debt dependence is the sum of net debt issued divided by the sum of capital expenditures and R&D expenses in the previous five years. Net debt issued is defined as the change in current debt plus the difference between long-term debt issuance and long-term debt reduction. We split our sample into two groups according to the median of debt dependence measure. Source: COMPUSTAT.
Default probability	An indicator that equals one for a firm that falls into the group of high default probability, and zero otherwise. The probability of default is estimated based on the Merton distance to default model (Bharath & Shumway, 2008). We divide the full sample into two groups according to the median of the average default probability in the previous three years. Source: COMPUSTAT and CRSP.
Dividend payout	The ratio of dividend payout to sales revenue. Source: COMPUSTAT.
FX Hedge	The maximum amount of foreign exchange derivatives a firm's lender uses for hedging purposes relative to the lender's total assets across all lenders for the firm over the previous five years. Source: Federal Reserve call report and DealScan.
Largest IO	Percentage ownership of the largest shareholder. Source: Refinitiv.
Leverage	The ratio of long-term debt to total assets. Source: COMPUSTAT.
R&D	An indicator that equals one for a firm that falls into the group of high R&D expense, and zero otherwise. We divide the full sample into two groups according to the median of the average R&D expenses relative to sales revenue in the previous three years. Source: COMPUSTAT.
Responsible lender	An indicator that equals one for a firm with socially responsible lenders, and zero otherwise. The responsible lender is the lender who has signed the Equator Principles (EP) or Principles for Responsible Investment (PRI). Source: EP, PRI, and DealScan.
Responsible shareholder	An indicator that equals one for a firm that falls into the group of high responsible investor ownership, and zero otherwise. The responsible investor is the institutional investor that has signed the PRI. We calculate the aggregated ownership of responsible investors for a firm as its responsible investor ownership. We split our sample into two groups according to the median of responsible investor ownership. Source: PRI and Factset.
ROA	Return on assets, the ratio of net income to total assets. Source: COMPUSTAT.
Size	The natural logarithm of book assets plus one. Source: COMPUSTAT.
Tobin's Q	Book value of assets minus book value of equity plus the market value of equity, divided by book value of assets. Source: COMPUSTAT.
Macroeconomic variables	
Credit spread	The difference between Moody's Baa corporate bond yield index and Moody's Aaa corporate bond yield index. Source: Federal Reserve Board H15.

Market return	Annual stock market returns (value weighted, with dividends). Source: CRSP.
Risk-free rate	Market yield on U.S. Treasury securities at 5-year constant maturity, quoted on investment basis. Source: Federal Reserve Board H15.

Table 1: Descriptive Statistics

The table presents the descriptive statistics of main variables in our sample. Our sample period is from 2007 to 2022. Panels A and B report the descriptive statistics for the variables for all firms and CDS-referenced firms, respectively. The definitions of all variables are reported in Appendix C.

Panel A: All firms						
Variables	# of Obs.	Mean	Std. Dev	P5%	P50%	P95%
Corporate environmental and social irresponsibility						
ESI Volume$_{i,t}$	31492	0.326	0.653	0.000	0.000	1.946
ESI Impact$_{i,t}$	31492	0.549	1.033	0.000	0.000	2.996
Credit default swap activities						
CDS active$_{i,t-1}$	31492	0.303	0.459	0.000	0.000	1.000
CDS quote$_{i,t-1}$	31492	0.999	2.210	0.000	0.000	7.000
Other variables						
Option active$_{i,t-1}$	31492	0.857	0.350	0.000	1.000	1.000
CapEx$_{i,t-1}$	31492	0.043	0.051	0.000	0.027	0.153
Cash$_{i,t-1}$	31492	0.155	0.182	0.004	0.084	0.578
Current ratio$_{i,t-1}$	31492	2.487	2.591	0.570	1.703	7.367
Dividend payout$_{i,t-1}$	31492	0.033	0.066	0.000	0.004	0.164
Largest IO$_{i,t-1}$	31492	0.191	0.171	0.070	0.130	0.590
Leverage$_{i,t-1}$	31492	0.239	0.215	0.000	0.205	0.654
ROA$_{i,t-1}$	31492	0.000	0.178	-0.297	0.032	0.162
Size$_{i,t-1}$	31492	7.596	1.993	4.183	7.640	10.894
Tobin'Q$_{i,t-1}$	31492	2.033	1.597	0.901	1.479	5.253
Credit spread$_{i,t-1}$	31492	1.125	0.587	0.650	0.960	3.090
Market return$_{i,t-1}$	31492	0.112	0.166	-0.382	0.158	0.313
Risk-free rate$_{i,t-1}$	31492	1.920	1.015	0.390	1.700	4.530
Panel B: CDS-referenced firms						
Variables	# of Obs.	Mean	Std. Dev	P5%	P50%	P95%
Corporate environmental and social irresponsibility						
ESI Volume$_{i,t}$	10228	0.708	0.880	0.000	0.000	2.639
ESI Impact$_{i,t}$	10228	1.151	1.330	0.000	0.000	3.714
Other variables						
Option active$_{i,t-1}$	10228	0.976	0.153	1.000	1.000	1.000
CapEx$_{i,t-1}$	10228	0.043	0.045	0.000	0.031	0.127
Cash$_{i,t-1}$	10228	0.104	0.112	0.004	0.067	0.330
Current ratio$_{i,t-1}$	10228	2.080	2.380	0.564	1.468	5.500
Dividend payout$_{i,t-1}$	10228	0.040	0.064	0.000	0.018	0.162
Large ratio$_{i,t-1}$	10228	0.139	0.115	0.063	0.111	0.300
Leverage$_{i,t-1}$	10228	0.301	0.194	0.031	0.275	0.676
ROA$_{i,t-1}$	10228	0.040	0.085	-0.068	0.040	0.153
Size$_{i,t-1}$	10228	9.292	1.351	7.255	9.180	11.793
Tobin'Q$_{i,t-1}$	10228	1.750	1.049	0.949	1.428	3.686
Credit spread$_{i,t-1}$	10228	1.132	0.596	0.650	0.980	3.380
Market return$_{i,t-1}$	10228	0.112	0.168	-0.382	0.158	0.313
Risk-free rate$_{i,t-1}$	10228	1.935	1.031	0.390	1.700	4.530

Table 2: CDS Activities and Corporate Social Irresponsibility

The table reports the regression results on the effect of CDS activities on referenced firms' corporate social irresponsible performance. *CDS active*$_{i,t-1}$ is an indicator that equals one if firm *i* has CDS quotes in year *t-1* and zero otherwise. *ESI Volume*$_{i,t}$ (*ESI Impact*$_{i,t}$) is the logarithm of one plus total E&S incidents amount (impact) for firm *i* in year *t* based on the RepRisk dataset. E&S incidents impact is estimated as the product of severity, reach, and novelty for each incident. The standard errors are clustered by firm. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Baseline		Industry fixed effects		Remove CDS firms introduced before 2007		After CDS Big Bang		Firms with debt only	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$	0.136***	0.205***	0.136***	0.205***	0.198***	0.278***	0.151**	0.201**	0.111**	0.172**
	(2.65)	(2.74)	(2.64)	(2.73)	(3.89)	(3.71)	(2.49)	(2.22)	(2.28)	(2.39)
Option active$_{i,t-1}$	-0.121***	-0.156***	-0.121***	-0.156***	-0.065***	-0.094***	-0.097***	-0.129***	-0.129***	-0.163***
	(-11.12)	(-8.40)	(-11.08)	(-8.37)	(-6.36)	(-5.24)	(-7.84)	(-5.87)	(-10.84)	(-8.07)
Size$_{i,t-1}$	0.065***	0.114***	0.065***	0.114***	0.064***	0.106***	0.066***	0.117***	0.072***	0.126***
	(6.78)	(7.89)	(6.75)	(7.86)	(6.30)	(6.85)	(6.49)	(7.48)	(6.87)	(7.95)
Cash$_{i,t-1}$	0.088***	0.118**	0.088***	0.118**	0.037	0.047	0.066**	0.082	0.063*	0.073
	(3.10)	(2.44)	(3.08)	(2.44)	(1.43)	(1.02)	(2.17)	(1.55)	(1.86)	(1.27)
CapEx$_{i,t-1}$	0.093	0.184	0.093	0.184	-0.003	0.052	0.137	0.269	0.153	0.284*
	(1.04)	(1.22)	(1.03)	(1.22)	(-0.04)	(0.34)	(1.36)	(1.57)	(1.55)	(1.73)
Dividend payout$_{i,t-1}$	0.054	-0.012	0.054	-0.012	0.010	-0.043	-0.010	-0.122	0.055	-0.023
	(0.78)	(-0.11)	(0.78)	(-0.11)	(0.15)	(-0.38)	(-0.13)	(-0.98)	(0.72)	(-0.19)
Leverage$_{i,t-1}$	0.050**	0.049	0.050**	0.049	0.036	0.050	0.039	0.038	0.049*	0.044
	(1.99)	(1.19)	(1.98)	(1.18)	(1.50)	(1.24)	(1.44)	(0.86)	(1.83)	(0.99)
Tobin'Q$_{i,t-1}$	0.008**	0.014***	0.008**	0.014***	0.005*	0.010**	0.008**	0.016***	0.012***	0.019***
	(2.51)	(2.79)	(2.50)	(2.78)	(1.66)	(2.03)	(2.57)	(2.91)	(3.11)	(3.14)
ROA$_{i,t-1}$	-0.081***	-0.133***	-0.081***	-0.133***	-0.063***	-0.093***	-0.074***	-0.121***	-0.086***	-0.139***
	(-4.50)	(-4.24)	(-4.48)	(-4.23)	(-3.69)	(-3.09)	(-3.88)	(-3.59)	(-4.07)	(-3.86)
Current ratio$_{i,t-1}$	-0.002	-0.001	-0.002	-0.001	-0.002	-0.002	-0.002	-0.003	-0.002	-0.001
	(-1.17)	(-0.55)	(-1.17)	(-0.55)	(-1.49)	(-0.80)	(-1.47)	(-0.84)	(-1.09)	(-0.39)
Largest IO$_{i,t-1}$	-0.032	-0.020	-0.032	-0.020	0.002	0.011	-0.015	0.003	-0.041	-0.032
	(-1.33)	(-0.50)	(-1.33)	(-0.50)	(0.08)	(0.28)	(-0.58)	(0.06)	(-1.63)	(-0.75)
Risk-free rate$_{i,t-1}$	0.027**	0.042*	0.027**	0.042*	0.021*	0.028	0.022	0.034	0.021	0.029
	(2.03)	(1.80)	(2.02)	(1.79)	(1.73)	(1.19)	(1.45)	(1.26)	(1.42)	(1.14)
Credit spread$_{i,t-1}$	-0.010	-0.006	-0.010	-0.006	-0.004	-0.008	-0.021	-0.022	-0.013	-0.014
	(-0.63)	(-0.18)	(-0.63)	(-0.18)	(-0.26)	(-0.29)	(-1.09)	(-0.63)	(-0.70)	(-0.40)
Market return$_{i,t-1}$	-0.063*	-0.104	-0.063*	-0.104	-0.039	-0.073	-0.081**	-0.131*	-0.053	-0.087
	(-1.74)	(-1.57)	(-1.73)	(-1.56)	(-1.09)	(-1.09)	(-2.06)	(-1.85)	(-1.31)	(-1.18)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of CDS firms	789	789	789	789	185	185	764	764	785	785
# of firms	2946	2946	2946	2946	2342	2342	2830	2830	2841	2841
# of observations	31492	31492	31492	31492	23491	23491	27409	27409	28601	28601
Adj. R-sq	0.701	0.630	0.699	0.627	0.526	0.445	0.717	0.640	0.705	0.634

Table 3: The Dynamic Effects of CDS Activities on Corporate Social Irresponsibility

This table presents the regression results to examine the dynamic effects of CDSs on corporate social irresponsibility. The formula is: $ESI_{i,t} = \alpha + \beta_1(CDS\ firm_{i,t-1} \times Before^j) + \beta_2(CDS\ firm_{i,t-1} \times Current) + \beta_3(CDS\ firm_{i,t-1} \times After^j) + \delta X_{i,t-1} + \varepsilon_{i,t}$, $CDS\ firm_{i,t-1}$ is an indicator that equals one for all firm i observations if a CDS trading on firm i is documented before or during our sample period, and 0 otherwise. $Before^j$ ($After^j$) equals one if the observation is j year before (after) the initiation of CDS trading. *Current* equals one if the observation is in the initiation year. In both regressions, control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All standard errors are clustered by firm. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Dependent Variables	$ESI\ Volume_{i,t}$	$ESI\ Impact_{i,t}$
$CDS\ firm_{i,t-1} \times Before^3$	-0.045	-0.085
	(-0.70)	(-0.84)
$CDS\ firm_{i,t-1} \times Before^2$	0.097	0.152
	(1.62)	(1.35)
$CDS\ firm_{i,t-1} \times Current$	0.016	-0.011
	(0.40)	(-0.15)
$CDS\ firm_{i,t-1} \times After^1$	0.133***	0.198**
	(2.59)	(2.13)
$CDS\ firm_{i,t-1} \times After^2$	0.116**	0.196**
	(2.03)	(1.98)
$CDS\ firm_{i,t-1} \times After^3$	0.184***	0.271***
	(3.10)	(2.85)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	789	789
# of firms	2946	2946
# of observations	31492	31492
Adj. R-sq	0.702	0.631

Table 4: Robustness Analysis

The table presents the regression results to examine the effect of CDS activities on corporate social irresponsibility under various scenarios. Panel A reports the regression results with alternative dependent and independent variables. In columns (1) and (2), we alleviate the heterogeneity of E&S incidents across industries by employing the logarithm of the difference between the firm-level number (impacts) of E&S incidents and the average number (impacts) of E&S incidents within an industry in a year. In column (3), *ESI Dummy* is an indicator that equals one if a firm has at least one environmental or social incident in a year, and zero otherwise. In column (4), *ES concern* is the sum of the indicators of firms' community, diversity, employee relations, environment, and human rights concerns in the MSCI KLD Stats Database. We scale the concerns for each category by dividing the number of concerns for each firm-year by the maximum number of concerns for that category within an industry in a year. In columns (5) and (6), we use the number of distinct financial institutions that provide valid CDS quotes on a referenced firm in a year to reflect CDS endogenous liquidity. Panel B reports the regression results after including lagged corporate social irresponsibility proxies, CEO age, and board size as control variables. In all regressions, control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All standard errors are clustered by firm. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Alternative Measures

	Alternative ESI Measures				Alternative CDS Measures	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variables	*ESII Volume*$_{i,t}$	*ESII Impact*$_{i,t}$	*ESI Dummy*$_{i,t}$	*ES concern*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$	0.049**	0.060**	0.063**	0.108*		
	(2.10)	(2.47)	(2.10)	(1.88)		
CDS quotes$_{i,t-1}$					0.032***	0.040***
					(8.00)	(6.77)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
# of CDS firms	789	789	789	688	789	789
# of firms	2946	2946	2946	2060	2946	2946
# of observations	31492	31492	31492	16995	31492	31492
Adj. R-sq	0.779	0.779	0.474	0.597	0.703	0.631

Panel B: Additional Control Variables

	(1)	(2)	(3)	(4)	(5)	(6)
Additional Control=	*PESI Volume*$_{i,t-1}$	*PESI Impact*$_{i,t-1}$	*CEO age*$_{i,t-1}$	*CEO age*$_{i,t-1}$	*Board size*$_{i,t-1}$	*Board size*$_{i,t-1}$
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$	0.107**	0.182**	0.150**	0.216**	0.142***	0.213***
	(2.35)	(2.32)	(2.38)	(2.36)	(2.71)	(2.79)
Additional control$_{i,t-1}$	0.312***	0.142***	-0.022	-0.024	0.005	0.016
	(18.07)	(8.04)	(-0.45)	(-0.32)	(0.34)	(0.73)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
# of CDS firms	770	770	692	692	774	774
# of firms	2770	2770	1672	1672	2707	2707
# of observations	28329	28329	20721	20721	28883	28883
Adj. R-sq	0.729	0.644	0.721	0.655	0.705	0.634

Table 5: Endogeneity Analysis: Propensity Score Matching

The table reports the regression results using a propensity score matching approach. Panel A reports the comparison of firm characteristics before and after a nearest neighbour matching method. Panel B reports the regression results. The sample includes CDS-referenced and matched non-CDS-referenced firms. Control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All standard errors are clustered by firm. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: The comparison of firm characteristics before and after PSM

	Full Sample			*PSM Sample*		
	CDS firms	Non-CDS firms	Diff (*p*-value)	CDS firms	Non-CDS firms	Diff (*p*-value)
Propensity score$_{i,t-1}$	0.108	0.029	0.079***	0.108	0.108	0.000
			(0.000)			(0.994)
Option active$_{i,t-1}$	0.968	0.800	0.169***	0.968	0.969	-0.001
			(0.000)			(0.939)
Size$_{i,t-1}$	8.309	6.780	1.530***	8.309	8.341	-0.031
			(0.000)			(0.638)
Cash$_{i,t-1}$	0.157	0.179	-0.022***	0.157	0.156	0.002
			(0.004)			(0.855)
CapEx$_{i,t-1}$	0.059	0.043	0.015***	0.059	0.056	0.003
			(0.000)			(0.468)
Dividend payout$_{i,t-1}$	0.037	0.029	0.008***	0.037	0.042	-0.005
			(0.004)			(0.208)
Leverage$_{i,t-1}$	0.279	0.209	0.069***	0.279	0.284	-0.005
			(0.000)			(0.675)
Tobin'Q$_{i,t-1}$	2.148	2.170	-0.022	2.148	2.114	0.033
			(0.748)			(0.692)
ROA$_{i,t-1}$	0.042	-0.019	0.061***	0.042	0.038	0.004
			(0.000)			(0.461)
Current ratio$_{i,t-1}$	2.140	2.683	-0.543***	2.140	2.036	0.105
			(0.000)			(0.325)
Largest IO$_{i,t-1}$	0.150	0.216	-0.066***	0.150	0.158	-0.009
			(0.000)			(0.198)
Risk-free rate$_{i,t-1}$	2.282	1.914	0.368***	2.282	2.231	0.051
			(0.000)			(0.412)
Credit spread$_{i,t-1}$	1.230	1.122	0.108***	1.230	1.264	-0.034
			(0.000)			(0.389)
Market return$_{i,t-1}$	0.092	0.113	-0.021***	0.092	0.086	0.006
			(0.001)			(0.581)

Panel B: Regression results

	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$	0.161***	0.216***
	(3.23)	(2.92)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	127	127
# of firms	811	811
# of observations	9795	9795
Adj. R-sq	0.550	0.474

Table 6: Endogeneity Analysis: Instrumental Variable Approach

The table reports the regression results using instrumental variable approach. We employ lenders' hedging activities on foreign exchange (*FX Hedge*) and lenders' preference for the usage of CDSs (*CDS borrower*) as instrumental variables. *FX Hedge* is the maximum amount of foreign exchange derivatives a firm's lender uses for hedging purposes relative to the lender's total assets across all lenders for the firm over the previous five years. *CDS borrower* is the maximum value of all lenders' CDS preference measure of a firm. A lender's CDS preference measure is the ratio of a lender's CDS-referenced borrowers to the total number of borrowers who borrowed money from the lender in the previous five years. We perform two-stage regressions following Adams et al. (2009). Panel A reports the first-stage regression results on the relationship between the instrumental variable and CDS trading. Panel B reports the third-stage regression results on the relationship between the predicted $CDS\ active_{i,t-1}$ in the second-stage and corporate social irresponsibility. Control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All control variables are lagged by one year. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: The instrumental variables and CDS trading

	(1)	(2)
	IV: FX Hedge	*IV: CDS borrower*
Dependent Variables	$CDS\ active_{i,t}$	$CDS\ active_{i,t}$
$IV_{i,t-1}$	0.488***	2.405***
	(6.27)	(14.59)
Control variables	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
# of observations	29300	29300
Pseudo R^2	0.568	0.615

Panel B: CDS trading and corporate social irresponsibility

	(1)	(2)	(3)	(4)
	IV: FX Hedge		*IV: CDS borrower*	
Dependent Variables	$ESI\ Volume_{i,t}$	$ESI\ Impact_{i,t}$	$ESI\ Volume_{i,t}$	$ESI\ Impact_{i,t}$
$Instrumented\ CDS\ active_{i,t-1}$	0.314***	0.468***	0.219***	0.341***
	(6.10)	(6.00)	(4.33)	(4.54)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
# of CDS firms	774	774	774	774
# of firms	2742	2742	2742	2742
# of observations	29300	29300	29300	29300
Adj. R^2	0.705	0.635	0.705	0.635

Table 7: Mechanism Analysis: Responsible Creditors and Shareholders

The table reports regression results that examine the impact of responsible creditors and shareholders on the relationship between CDS trading activities and corporate environmental and social irresponsible performance. *Responsible Creditor*$_{i,t-1}$ equals one when a referenced firm has socially responsible creditors in year *t-1*, and zero otherwise. Responsible creditors are lenders who have signed the Equator Principles (EP) or Principles for Responsible Investment (PRI). We extracted syndicated loan information from DealScan. *Responsible shareholder*$_{i,t-1}$ equals one when the percentage of a referenced firm's shares held by responsible shareholders is above the sample median in year *t-1*, and zero otherwise. Responsible shareholders are institutional investors who have signed the PRI. Control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All standard errors are clustered by firm. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Responsible creditors		
	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*Responsible Creditor*$_{i,t-1}$	0.138***	0.150**
	(3.29)	(2.16)
CDS active$_{i,t-1}$	0.012	0.071
	(0.22)	(0.79)
Responsible lender$_{i,t-1}$	-0.011	-0.007
	(-0.81)	(-0.30)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	789	789
# of firms	2946	2946
# of observations	31492	31492
Adj. R-sq	0.702	0.630
Panel B: Responsible shareholders		
	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*Responsible shareholder*$_{i,t-1}$	-0.061***	-0.060*
	(-2.88)	(-1.83)
CDS active$_{i,t-1}$	0.183***	0.257***
	(3.41)	(3.26)
Responsible shareholder$_{i,t-1}$	-0.022***	-0.021
	(-2.71)	(-1.49)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	752	752
# of firms	2786	2786
# of observations	29859	29859
Adj. R-sq	0.703	0.631

Table 8: Mechanism Analysis: Creditor Monitoring

The table reports regression results that examine the impact of creditor monitoring on the relationship between CDSs and ES risk. *Debt dependence*$_{i,t-1}$ equals one for firms with high levels of debt dependence in year *t-1* and zero otherwise, according to the sample median. Debt dependence is the sum of net debt issued divided by the sum of capital expenditures and R&D expenses in the previous five years. *Bank lender*$_{i,t-1}$ equals one for a firm that has bank lenders in year *t-1*, and zero otherwise. We extract the information on bank lenders from DealScan. Control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All control variables are lagged by one year. We include firm and year fixed effects and cluster standard errors by firm in all regression models. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Debt dependence		
	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*Debt dependence*$_{i,t-1}$	0.061***	0.069**
	(3.27)	(2.31)
CDS active$_{i,t-1}$	0.112*	0.187**
	(1.92)	(2.21)
Debt dependence$_{i,t-1}$	-0.008	-0.003
	(-1.04)	(-0.24)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	735	735
# of firms	2752	2752
# of observations	29023	29023
Adj. R-sq	0.702	0.632
Panel B: Bank lenders		
	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*Bank lender*$_{i,t-1}$	0.152***	0.165**
	(3.37)	(2.14)
CDS active$_{i,t-1}$	-0.001	0.057
	(-0.02)	(0.60)
Bank lender$_{i,t-1}$	-0.001	0.007
	(-0.01)	(0.31)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	789	789
# of firms	2946	2946
# of observations	31492	31492
Adj. R-sq	0.702	0.630

Table 9: Mechanism Analysis: Debt Renegotiation Threat

The table reports regression results that examine the impact of the probability of debt renegotiation on the relationship between CDSs and ES risk. *Default probability*$_{i,t-1}$ equals one for firms with high levels of default probability in year *t-1*, and zero otherwise. We divide the full sample into high- and low-default probability groups according to the median of the average probability of default in the previous three years. *Cash flow volatility*$_{i,t-1}$ equals one for firms with more volatile cash flows in year *t-1*, and zero otherwise. Cash flow volatility is estimated as the standard deviation of free cash flow over the past five years. *R&D*$_{i,t-1}$ equals one for firms with high levels of R&D expense in year *t-1*, and zero otherwise. We divide the full sample into two groups according to the median of the average R&D expenses relative to sales revenue in the previous three years. Control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All control variables are lagged by one year. We cluster standard errors by firm in all regression models. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Default probability		
	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*Default probability*$_{i,t-1}$	0.080***	0.080**
	(3.30)	(2.11)
CDS active$_{i,t-1}$	0.029	0.078
	(0.50)	(0.92)
Default probability$_{i,t-1}$	-0.013	-0.008
	(-1.03)	(-0.35)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	775	775
# of firms	2653	2653
# of observations	27180	27180
Adj. R-sq	0.708	0.638

Table 9 – Continued

Panel B: Cash flow volatility		
	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*Cash flow volatility*$_{i,t-1}$	0.044***	0.041**
	(3.54)	(2.01)
CDS active$_{i,t-1}$	0.124**	0.197**
	(2.33)	(2.53)
Cash flow volatility$_{i,t-1}$	-0.012**	-0.018*
	(-2.37)	(-1.96)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	768	768
# of firms	2868	2868
# of observations	30447	30447
Adj. R-sq	0.703	0.632

Panel C: R&D expense		
	(1)	(2)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*R&D*$_{i,t-1}$	0.139**	0.209**
	(2.33)	(2.17)
CDS active$_{i,t-1}$	0.114*	0.169*
	(1.84)	(1.74)
R&D$_{i,t-1}$	-0.040**	-0.049
	(-2.08)	(-1.52)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
# of CDS firms	411	411
# of firms	1590	1590
# of observations	16093	16093
Adj. R-sq	0.737	0.667

Table 10: The Effects of E&S Performance

The table reports regression results that examine the effects of E&S performance. *ES* is firms' E&S ratings. In columns (1) and (2), *ES* is the sum of the indicators of firms' community, diversity, employee relations, environment, and human rights performance in the MSCI KLD Stats Database. We scale the strengths (concerns) for each category by dividing the number of strengths (concerns) for each firm-year by the maximum number of strengths (concerns) for that category within an industry in a year and then subtract the concerns index from the strengths index. In columns (3) to (6), *ES* is the average between environmental and social pillar scores based on Thomson Reuter's Refinitiv ESG database and MSCI's Intangible Value Assessment (IVA) database, respectively. In all regressions, control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All standard errors are clustered by firm. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	KLD		Asset4		IVA	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variables	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$	*ESI Volume*$_{i,t}$	*ESI Impact*$_{i,t}$
CDS active$_{i,t-1}$×*ES*$_{i,t-1}$	0.079***	0.102***	0.220***	0.316***	0.177*	0.390**
	(5.93)	(4.96)	(4.25)	(3.70)	(1.70)	(2.38)
ES$_{i,t-1}$	-0.042***	-0.058***	-0.156***	-0.145**	-0.242***	-0.335***
	(-4.65)	(-4.04)	(-4.37)	(-2.48)	(-3.89)	(-3.16)
CDS active$_{i,t-1}$	0.069	0.104	-0.005	-0.007	-0.013	-0.093
	(1.32)	(1.29)	(-0.07)	(-0.06)	(-0.17)	(-0.72)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
# of CDS firms	703	703	721	721	719	719
# of firms	2150	2150	2072	2072	2052	2052
# of observations	18512	18512	17932	17932	16769	16769
Adj. R-sq	0.727	0.655	0.723	0.653	0.734	0.662

Table 11: Demystifying the Effects of CDS Trading on E&S Issues

The table reports regression results to examine the effects of CDS trading on specific E&S issues. The dependent variables are the logarithm of one plus the total number of incidents related to each issue for firm *i* in fiscal year *t*. The detailed definition and distribution of each issue are reported in Appendix A. Control variables include option trading, firm size, cash holdings, capital expenditure, dividend payout ratio, leverage ratio, Tobin's Q, ROA, current ratio, largest shareholder ownership, the risk-free rate, credit spread, and stock market return. All standard errors are clustered by firm. *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Environmental issues

	(1)	(2)	(3)	(4)	(5)
Dependent Variables	$EI_{i,t}$	*Climate change*$_{i,t}$	*Pollution*$_{i,t}$	*Ecosystem*$_{i,t}$	*Waste*$_{i,t}$
CDS active$_{i,t-1}$	0.041**	0.025**	0.018**	0.011	0.001
	(2.08)	(1.97)	(1.98)	(0.80)	(0.20)
Control variables	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
# of observations	31492	31492	31492	31492	31492
Adj. R-sq	0.528	0.364	0.325	0.416	0.232

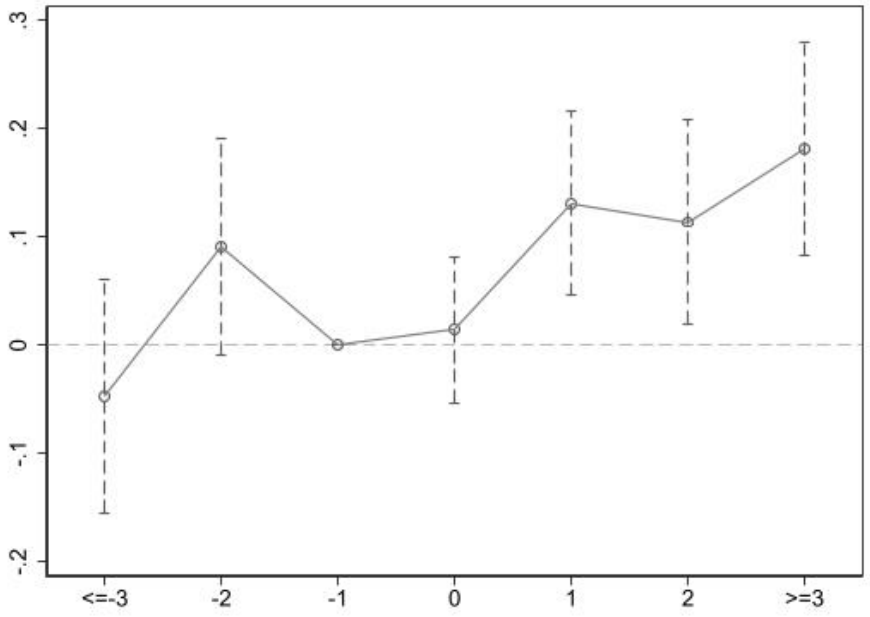
Panel B: Social issues

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variables	$SI_{i,t}$	*Human right*$_{i,t}$	*Community*$_{i,t}$	*Social discrimination*$_{i,t}$	*Forced labor*$_{i,t}$	*Freedom association*$_{i,t}$	*Employment discrimination*$_{i,t}$	*Occupational health*$_{i,t}$	*Employment condition*$_{i,t}$
CDS active$_{i,t-1}$	0.114**	0.121***	0.021	0.009	0.024**	0.021*	0.029**	-0.009	0.018
	(2.52)	(3.51)	(1.16)	(0.98)	(2.05)	(1.88)	(2.23)	(-0.62)	(0.85)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	31492	31492	31492	31492	31492	31492	31492	31492	31492
Adj. R-sq	0.616	0.521	0.384	0.293	0.350	0.347	0.290	0.372	0.433

Figure 1: The dynamic effect of CDSs on ES risk

The figure presents the regression results to examine the dynamic effects of CDS trading on corporate ES risk. We replace *CDS active*$_{i,t-1}$ in model (1) with seven year dummies: $Before^3$, $Before^2$, $Before^1$, $Current$, $After^1$, $After^2$, $After^3$. $Current$ indicates the year in which CDS trading was initiated for CDS-referenced firms. $Before^j$ ($After^j$) indicates the j^{th} year before (after) $Current$, and zero otherwise. The vertical dashed lines present 90% confidence intervals.

Panel A: E&S incidents amount



Panel B: E&S incidents impact

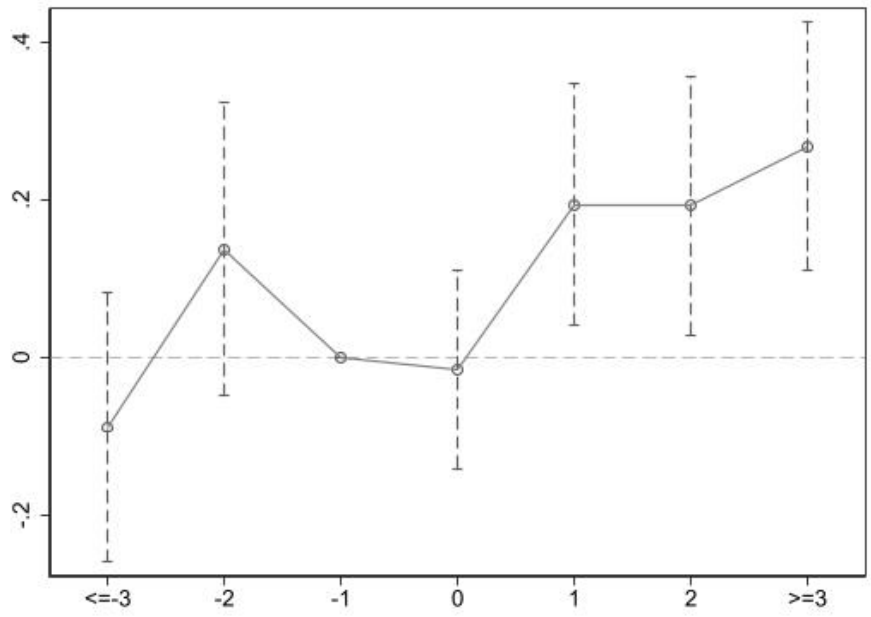
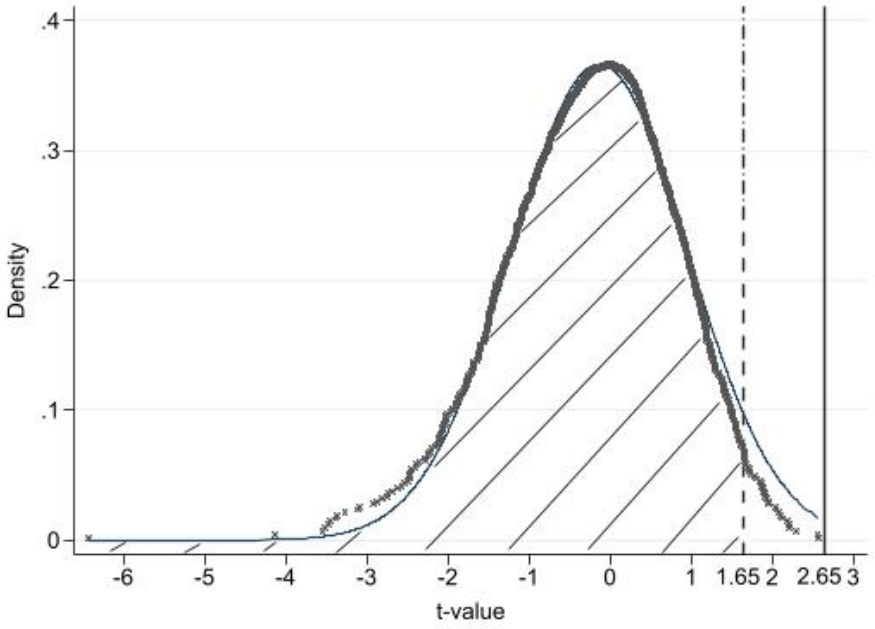


Figure 2: Placebo Test

The figure depicts the distribution of estimated *t*-statistics of CDS trading. We randomly identify CDS-referenced firms and perform the baseline regression model (1). We repeat the exercise 1000 times and plot the resulting estimated *t*-statistics. The vertical solid lines in Panels A and B present *t*-statistics of *CDS active*$_{i,t-1}$ in columns (1) and (2) of Table 2, respectively. The vertical dashed line presents a *t*-statistic of 1.65. Shaded areas indicate the cumulative probability of non-significant positive relationship at a 10% significance level.

Panel A: E&S incidents amount



Panel B: E&S incidents impact