

# An Analysis of Social Capital, Trust, and Firm Performance during the European Financial Crisis of 2008

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## Abstract

In the aftermath of the 2008-2009 financial crisis, the role of social capital, as measured by Corporate Social Responsibility (CSR), in influencing firm performance emerged as a critical factor in economic resilience. This study focuses on European non-financial firms to explore the dynamics of social capital during periods characterized by trust crises, particularly in the context of explaining returns. We aim to investigate whether the observed trend of higher stock returns in high-CSR firms during crises highlights the significance of trust among firms, stakeholders, and investors, aligning with findings from existing academic literature. By extending the discourse on trust and social capital, we emphasize the macroeconomic implications of our research. The objective is to delve into how trust, social capital, and CSR collectively influence firm-level performance in Europe.

In this study, we replicate and extend the analysis conducted by Lins, Servaes, and Tamayo in their paper titled "Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis", where they found that CSR is one of the main factors explaining returns during low-trust periods.

Our research builds upon their findings by examining the relationship between social capital, trust, and firm performance during the financial crisis in Europe, with a particular emphasis on understanding the impact of CSR in explaining or predicting returns. We investigate the value of CSR initiatives as strategic tools for mitigating adverse effects in turbulent economic environments.

# 1 Introduction

Our research builds upon the foundation laid by the work of Karl V. Lins, Henri Servaes, and Ane Tamayo in their paper titled "Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis" published in *The Journal of Finance, Volume LXXII, Number 4, August 2017*. While this study, hereinafter referred to as "the reference paper," predominantly focuses on the US market in the context of the financial crisis, our investigation extends its scope to encompass European companies. Specifically, we examine the performance and dynamics of EU companies during and after the financial crisis, as well as other periods up to the present, including the COVID era.

Addressing methodological challenges, our paper utilizes CSR scores as a measurable proxy for social capital, aligning with recent economic research. Utilizing causal inference analysis, our study seeks to contribute nuanced insights between CSR initiatives and returns performance across distinct contexts. We leverage the unexpected decline in public trust during the 2008-2009 financial crisis as a natural experiment to better understand the causal relationships between social capital, trust, and firm performance. This study conducts an empirical analysis of the performance of 4,882 non financial European firms over a period from 2006 to 2023. We analyze the relationship between corporate social responsibility and firm performance.

Our findings reveal that CSR scores are not significant in explaining returns for most periods between 2006 and 2023. Our analysis diverges from the findings of the reference paper, which reported contrasting results. While the reference paper suggested a significant relationship between CSR scores and returns, our study unveils a different narrative. Their main findings indicate that CSR is a significant factor in explaining returns during low-trust periods, that companies with higher CSR scores have higher returns, and that governance is not a relevant factor in explaining returns, contrary to CSR. We test the out-of-sample validity of their findings while contrasting the difference between our study performed in Europe and theirs in the US. This difference motivates a more thorough examination of how social capital impacts firm performance, revealing potential contextual nuances and underlying mechanisms.

## 2 Sample and Summary Statistics

### 2.1 Data Collection and Methodology

To construct our sample, we gathered quarterly information on 4,882 companies from Thomson Reuters Datastream spanning the years 2006 to 2023. These companies are listed entities from various European countries, including Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK. For companies with a local currency other than the euro and variables denominated in that currency, the values have been converted using the exchange rate provided by the ECB.

For our study, we collected data from different fields related to social capital and financial information. We obtained 21 different scores related to Corporate Social Responsibility (CSR) to choose the best scores in order to construct our CSR treatment variable, aiming to closely approximate the methodology used in the paper we are replicating, where they built their own score. Specifically, we selected one score per item evaluated in the reference paper, namely community, diversity, employee relations, environment, and human rights. To enhance the predictive power of our treatment variable on returns, we selected the index most correlated with returns for each category. Our constructed treatment variable, referred to as the "CSR Score" throughout the paper, is derived as the average of TRDIR Diversity Score, Human Rights Score, Workforce Score, Emissions Score, and Community Score. These scores, chosen from the categories community, diversity, employee relations, environment, and human rights, are the most highly correlated with returns among the categories utilized in the reference paper. However, we iterated our analysis through different scores to explore if any of them yielded similar results to the reference paper.

Regarding our main variables of our study: Returns were calculated using monthly adjusted closing prices obtained from the Yahoo Finance API through the "QuantMod" package in R. We utilized two variables for returns: raw returns, representing the company's raw returns, and abnormal returns, calculated using the residuals from regressing raw returns against the STOXX Europe 600 index. While the original paper used raw returns for momentum, we employed a different methodology. Our momentum variable was calculated as the difference in returns over a rolling window of three consecutive quarters, which we believe provides a more accurate measure of momentum.

To conduct our causal inference analysis, we employed a two-way fixed effects approach combined with difference-in-differences analysis. Within this framework, our CSR-based index served as a continuous treatment variable, allowing for heterogeneous treatment effects over time. Given the nature of our analy-

sis, where treatment and control groups are not explicitly distinguished, except for certain quantile regressions, our focus was on assessing the treatment effect across the entire sample. This approach poses challenges in assessing causality, particularly in a context where there is considerable unobserved heterogeneity assumed to remain constant over time. It's worth noting that the reference paper employs a traditional approach for the treatment variable in a TWFE DiD regression without interacting it with a time variable and allowing heterogeneous treatment effect. For further details, see Athey, Susan, and Guido W. Imbens (2018) and Imai, Kosuke, and In Song Kim (2019). For our analysis, we utilized the 'plm' package in R and we replicated the same regressions as the original paper.

Table 1 presents descriptive statistics for all the collected variables, providing insights into the characteristics of the sample units. Dummy B/M is a binary variable that takes the value of 1 if the Book-to-Market ratio is negative and 0 otherwise. Idiosyncratic Risk represents the variance of the residuals from the estimated model for the abnormal returns. The remaining variables are self-explanatory based on their names.

The average market value of our sample frame is 7 billion euros, however there are companies reaching market values of up to 400 billion euros. Our sample comprises mid to mega-cap companies, resulting in significant heterogeneity in size. Including 18 different companies and encompassing 128 activities under the Thomson Reuters Business Classification (TRBC), excluding financial firms, our sample offers a diverse representation. The mean raw return is 0.12, while the abnormal returns average slightly higher at 0.3 points. Notably, the abnormal returns closely resemble the raw returns due to our calculation method, which employs a single coefficient to calculate all the residuals. While this approach deviates from other possible methods, such as regressing by period, it aligns with the conditions of the reference paper we aim to replicate, it does not give further guidance on the exact details of the regression that is done. Additionally, the CSR-related scores exhibit substantial dispersion.

In contrast to the reference paper, which focuses on 1,673 US companies, our analysis aims to enhance generalizability by employing a broader sample frame that encompasses a larger and more heterogeneous set of companies. However, the inclusion of companies from multiple countries poses a limitation, as the financial crisis may have varied effects across different regions. Notably, in Europe, this poses a challenge, as companies may engage in diverse business activities across different regions, making it difficult to analyze the effects of the crisis even after controlling for country. The existence of complex spillover effects adds further complexity to the analysis, complicating the interpretation of results.

In Table 2, we observe that the correlation between returns and other secondary variables of our study during all the periods of our sample frame. Our

dummy variable for Country shows minimal correlation, similar to what we observe with our industry dummy. The limited usefulness of our activity variable encompassing 128 distinct categories poses a significant challenge for regression analysis. All the coefficients in the matrix relating to returns exhibit reasonable signs. Notably, it’s intriguing to observe a negative correlation between returns and the number of employees, which may be explained by the increased operating costs associated with lower returns. We do not observe a negative relationship between liabilities and returns, which may seem counterintuitive at first glance. However, This finding is not unexpected and may be consistent with the operating performance and financing needs of companies.

In Table 3, we present the correlation matrix of the main variables utilized in the regressions. It’s worth noting that the variable "Cash" in this table differs slightly from the one in Table 2, as it encompasses both cash and short-term investments. Nevertheless, we observe consistent signs in line with the correlation matrix of the reference paper. One notable distinction is that, in contrast to the reference paper, where Long-Term Debt and Idiosyncratic Risk exhibit negative correlations with returns, our correlations are positive. However, the correlation values for all variables in the reference paper are generally higher, which leads to more significance results for their regressions.

Interestingly, in the reference paper, their treatment variable, or CSR score, demonstrates the third-highest correlation with returns, only below abnormal returns and idiosyncratic risk, surpassing variables such as Market Cap, Profitability, Book to Market ratio, and Momentum, which are typically considered significant determinants of returns. This discrepancy stands out as a key factor in explaining our differing results. Our correlation matrix effectively reflects the significance of variables in our regression analyses and aligns closely with our regression results. Our treatment variable ranks seventh in terms of correlation with other main variables.

In Table 4, we observe a correlation matrix between all CSR-related scores and returns. We notice that even the most highly correlated score, out of the 22, would have ranked fifth in the main variables matrix in contrast with the reference paper statistics, moreover we find our CSR Score positioned in a mid-ranking position. It’s noteworthy that the two scores related to controversies rank the highest, and their correlation with returns is positive. In contrast to the reference paper, which found no significant effects of the Governance score on returns, our correlation matrix places the Governance score ahead of most other scores. This suggests a higher potential for significance in regression analyses than other CSR-related scores.

Table 1: Summary Statistics

| Field                          | Mean             | Std               | Max                | Min            |
|--------------------------------|------------------|-------------------|--------------------|----------------|
| Market Value                   | 7,681,059,617.61 | 25,518,938,058.31 | 444,619,890,000.00 | 626,437,606.41 |
| Assets                         | 6,300,568,993.24 | 13,356,843,161.94 | 177,884,184,831.40 | 626,845,695.65 |
| Liabilities                    | 4,056,030,856.80 | 7,608,447,740.79  | 91,971,712,462.22  | 404,971,673.33 |
| Long Term Debt                 | 2,626,859,106.85 | 6,140,083,836.35  | 79,999,754,308.11  | 223,347,161.22 |
| Current Assets                 | 2,405,196,192.17 | 2,040,344,108.26  | 95,711,218,508.83  | 18,013,492.74  |
| Current Liabilities            | 1,429,171,749.95 | 1,644,584,031.86  | 11,971,958,154.11  | 181,609,571.94 |
| Cash & Short term investments  | 1,179,168,515.16 | 1,863,795,009.97  | 32,793,800,000.00  | 112,370,960.02 |
| Cash                           | 823,091,622.48   | 1,641,469,789.58  | 30,520,586,000.00  | 88,071,230.23  |
| Accounts Payable               | 750,164,425.96   | 851,433,921.75    | 1,719,094,098.49   | 78,189.00      |
| Employees number               | 9,339.55         | 28,533.59         | 721,000.00         | 915.00         |
| TRDIR Controversies Score      | 53.17            | 13.06             | 100.00             | 25.00          |
| ESG Controversies Score        | 51.95            | 18.08             | 100.00             | 2.50           |
| Workforce Score                | 38.79            | 15.15             | 99.91              | 0.69           |
| Emissions Score                | 31.81            | 14.87             | 99.91              | 3.19           |
| Resource Use Score             | 31.59            | 14.84             | 99.90              | 3.16           |
| Social Pillar Score            | 31.27            | 13.23             | 98.47              | 3.13           |
| Product Responsibility Score   | 30.20            | 14.96             | 99.85              | 3.02           |
| Shareholders Score             | 29.78            | 14.04             | 99.92              | 2.99           |
| ESG Score                      | 29.75            | 12.07             | 95.77              | 3.03           |
| Management Score               | 29.57            | 14.00             | 99.92              | 2.98           |
| Community Score                | 29.28            | 14.35             | 99.87              | 2.95           |
| Governance Pillar Score        | 29.09            | 12.43             | 99.04              | 3.06           |
| CSR Merged Index               | 29.02            | 11.45             | 92.60              | 10.69          |
| TRDIR Score                    | 28.71            | 6.26              | 87.00              | 23.00          |
| ESG Combined Score             | 28.54            | 11.45             | 95.16              | 2.86           |
| Environment Pillar Score       | 26.50            | 13.16             | 99.69              | 2.66           |
| Human Rights Score             | 26.48            | 14.97             | 99.31              | 2.65           |
| CSR Strategy Score             | 26.35            | 13.87             | 99.92              | 2.64           |
| TRDIR People Development Score | 24.54            | 7.93              | 99.00              | 0.92           |
| Environmental Innovation Score | 19.93            | 13.35             | 99.89              | 1.99           |
| TRDIR Diversity Score          | 18.71            | 6.04              | 84.00              | 1.94           |
| TRDIR Inclusion Score          | 11.28            | 6.00              | 100.00             | 1.13           |
| Operating Profit Margin        | 6.90             | 18.24             | 42.11              | -42.06         |
| Book to Market                 | 0.56             | 0.09              | 0.65               | 0.00           |
| Idiosyncratic Risk             | 0.31             | 0.22              | 1.00               | 0.00           |
| Abnormal Returns               | 0.30             | 0.97              | 54.45              | -24.75         |
| Returns                        | 0.12             | 0.78              | 54.72              | -25.43         |
| Dummy B/M                      | 0.00             | 0.01              | 1.00               | 0.00           |
| Momentum                       | 0.00             | 1.08              | 54.72              | -53.95         |
| CSR Score                      | 25.37            | 11.45             | 92.60              | 10.69          |

Table 2: Correlation Matrix of other secondary variables

| Field        | Mkt. Cap. | Accts. Pay. | Cash    | Curr. Assets | Emp. Num. | Tot. Assets | Tot. Liab. | Ret.    | Country | Activity |
|--------------|-----------|-------------|---------|--------------|-----------|-------------|------------|---------|---------|----------|
| Mkt. Cap.    | 1.0000    | -0.0286     | 0.3701  | 0.0006       | 0.1507    | 0.5193      | 0.4428     | 0.0047  | -0.0125 | 0.0065   |
| Accts. Pay.  | -0.0286   | 1.0000      | -0.1068 | 0.6830       | -0.1293   | -0.1037     | -0.0978    | 0.0501  | -0.0129 | 0.0004   |
| Cash         | 0.3701    | -0.1068     | 1.0000  | -0.1310      | 0.3691    | 0.6521      | 0.6088     | 0.0060  | -0.0304 | -0.0137  |
| Curr. Assets | 0.0006    | 0.6830      | -0.1310 | 1.0000       | -0.1469   | -0.1070     | -0.1053    | 0.0444  | 0.0006  | -0.0005  |
| Emp. Num.    | 0.1507    | -0.1293     | 0.3691  | -0.1469      | 1.0000    | 0.3920      | 0.4483     | -0.0054 | -0.0461 | -0.0632  |
| Tot. Assets  | 0.5193    | -0.1037     | 0.6521  | -0.1070      | 0.3920    | 1.0000      | 0.8549     | 0.0009  | -0.0156 | -0.0000  |
| Tot. Liab.   | 0.4428    | -0.0978     | 0.6088  | -0.1053      | 0.4483    | 0.8549      | 1.0000     | 0.0032  | -0.0200 | -0.0245  |
| Ret.         | 0.0047    | 0.0501      | 0.0060  | 0.0444       | -0.0054   | 0.0009      | 0.0032     | 1.0000  | -0.0050 | 0.0012   |
| Country      | -0.0125   | -0.0129     | -0.0304 | 0.0006       | -0.0461   | -0.0156     | -0.0200    | -0.0050 | 1.0000  | 0.0238   |
| Activity     | 0.0065    | 0.0004      | -0.0137 | -0.0005      | -0.0632   | -0.0000     | -0.0245    | 0.0012  | 0.0238  | 1.0000   |

Table 3: Correlation Matrix of the main variables

| Field               | Ret.    | CSR Score | Abn. Ret. | Idio. Risk | Mkt. Val. | LT Debt | Curr. Liab. | Cash    | Prof. Marg. | B/M     | Dummy B/M | Mom.    |
|---------------------|---------|-----------|-----------|------------|-----------|---------|-------------|---------|-------------|---------|-----------|---------|
| Returns             | 1.0000  | 0.0046    | 0.8046    | 0.0043     | 0.0603    | 0.0381  | 0.0003      | 0.0069  | 0.1310      | -0.0064 | -0.0007   | -0.6860 |
| CSR Score           | 0.0046  | 1.0000    | 0.0033    | 0.0018     | -0.2073   | -0.0066 | 0.3984      | 0.2640  | 0.0013      | 0.0265  | -0.0003   | 0.0006  |
| Abnormal Returns    | 0.8046  | 0.0033    | 1.0000    | 0.0043     | 0.0501    | 0.0325  | 0.0005      | 0.0068  | 0.1066      | -0.0072 | 0.0110    | -0.5515 |
| Idiosyncratic Risk  | 0.0043  | 0.0018    | 0.0043    | 1.0000     | 0.0043    | 0.0009  | -0.0025     | -0.0027 | -0.0011     | 0.0001  | -0.0006   | -0.0003 |
| Market Value        | 0.0603  | -0.2073   | 0.0501    | 0.0043     | 1.0000    | 0.0023  | -0.1412     | -0.0250 | 0.0012      | -0.1015 | 0.0028    | 0.0006  |
| Long Term Debt      | 0.0381  | -0.0066   | 0.0325    | 0.0009     | 0.0023    | 1.0000  | 0.0099      | 0.0048  | 0.0080      | -0.0027 | -0.0008   | 0.0000  |
| Current Liabilities | 0.0003  | 0.3984    | 0.0005    | -0.0025    | -0.1412   | 0.0099  | 1.0000      | 0.4909  | -0.0006     | 0.0301  | 0.0007    | -0.0002 |
| Cash                | 0.0069  | 0.2640    | 0.0068    | -0.0027    | -0.0250   | 0.0048  | 0.4909      | 1.0000  | -0.0009     | 0.0153  | 0.0011    | -0.0002 |
| Prof. Marg.         | 0.1310  | 0.0013    | 0.1066    | -0.0011    | 0.0012    | 0.0080  | -0.0006     | -0.0009 | 1.0000      | -0.0014 | -0.0045   | -0.1017 |
| Book to Market      | -0.0064 | 0.0265    | -0.0072   | 0.0001     | -0.1015   | -0.0027 | 0.0301      | 0.0153  | -0.0014     | 1.0000  | -0.0008   | -0.0020 |
| Dummy B/M           | -0.0007 | -0.0003   | 0.0110    | -0.0006    | 0.0028    | -0.0008 | 0.0007      | 0.0011  | -0.0045     | -0.0008 | 1.0000    | -0.0006 |
| Mom.                | -0.6860 | 0.0006    | -0.5515   | -0.0003    | 0.0006    | 0.0000  | -0.0002     | -0.0002 | -0.1017     | -0.0020 | -0.0006   | 1.0000  |

Table 4: Correlation Matrix of CSR-related scores

| FIELD                          | Returns |
|--------------------------------|---------|
| Returns                        | 1.0000  |
| TRDIR Controversies Score      | 0.0125  |
| ESG Controversies Score        | 0.0124  |
| Shareholders Score             | 0.0078  |
| Governance Pillar Score        | 0.0070  |
| TRDIR Diversity Score          | 0.0067  |
| Management Score               | 0.0065  |
| TRDIR People Development Score | 0.0062  |
| Human Rights Score             | 0.0054  |
| Workforce Score                | 0.0051  |
| CSR Strategy Score             | 0.0051  |
| TRDIR Score                    | 0.0049  |
| Emissions Score                | 0.0049  |
| ESG Combined Score             | 0.0047  |
| CSR Score                      | 0.0046  |
| Product Responsibility Score   | 0.0038  |
| ESG Score                      | 0.0037  |
| Social Pillar Score            | 0.0030  |
| Environment Pillar Score       | 0.0023  |
| TRDIR Inclusion Score          | 0.0020  |
| Resource Use Score             | 0.0015  |
| Community Score                | -0.0005 |
| Environmental Innovation Score | -0.0041 |

### 3 Baseline Results

#### 3.1 Crisis-Period Returns and CSR during the European Financial Crisis of 2008

In Table 5, we present the core results of our study derived from regressing raw returns and abnormal returns, denoted as "Returns" and "AbReturns" respectively in the table, with DiD format after controlling for the Fama-French three-factor model plus momentum and adding sample unit, time, and country as firm fixed effects (see Fama and French (1992)). In the equation below, we can see the exact model we have estimated. We have chosen not to control for activity, as it did not yield significant differences in the results of the regression. The wide range of values from 1 to 128 in different activity classifications suggests that effectively controlling for activity may not be very beneficial for our study. This observation may allow less significant variables capture more heterogeneity of the different activity dynamics. Moreover, the inclusion of this variable as a control in the regression is not statistically significant.

$$\text{Ab/Returns}_{it} = \beta_0 + \beta_1 \text{CSR}_{it} + \beta_i X_{it} + \text{FirmFixedEffects} + e_{it}$$

The regressions cover the periods from Q3 2008 to Q2 2009. Similar to the paper, we have also included firm's factor loadings based the Fama Model, Market Risk, Size, Value and Momentum. For ease of interpretation, we have scaled all variables in the regression to be centered at 50. The same results can be obtained without this scaling, it only facilitates interpretation by adjusting the decimal settings. In the tables, heteroscedasticity-consistent standard errors are provided in parentheses. Significance levels are denoted by \*\*\*, \*\*, and \*, indicating parameter estimates significantly different from zero at the 1%, 5%, and 10% levels, respectively.

We find that only Operating Profit Margin, Book to Market, and Momentum are significant in predicting or explaining returns. The coefficients for these variables are positive, except for Momentum, which aligns with logical expectations and the results of the reference paper. Similarly, the paper identifies six significant coefficients that match ours, except with the significance of Long-Term Debt, cash holdings, and their CSR Score. We find no significance for our treatment variable, the CSR score. The results are similar for abnormal returns. In individual regressions using only the treatment variable, we again find no significance, which suggest that is not a problem of other variable wrongly capturing the effect that should be attributed to our treatment variables.

These results come as no surprise when we consider the influence of correlations on regression coefficients, as elucidated earlier. Overall, the model shows limited explanatory capability, evident from relatively high residuals. We



conclude that during periods of diminished trust, such as the 2008 financial crisis, only Operating Profit Margin, Book to Market, and Momentum emerge as significant factors.

Upon reviewing Table 6, we notice that conducting the same regression but without fixed effect settings reveals further significant coefficients, notably our CSR Score, long-term debt, and market value. This is because not controlling for certain factors results in less significant variables capturing the effects of those factors. Therefore, the absence of activity probably enhances the significance of our CSR score rather than reducing it. Although CSR Score, long-term debt, and market values demonstrate a modest effect size, their significance is notable. However, it's worth noting that the overall model fit is inferior compared to when fixed effects are used. We can infer that, in general, our CSR score does not significantly contribute to explaining returns. However, when it does exhibit significance, its explanatory power and impact are less compared to market value, long-term debt, operating profit margin, and momentum. This contrasts with findings from the reference paper, where the CSR score ranked as one of the most influential variables.

To demonstrate that CSR scores generally do not significantly explain returns, we conducted 1584 regressions, iterating all our CSR-related scores across every quarter from 2006 to 2023 using the same settings as in table 5 and introduced earlier, TWFE DiD controlling for the Fama-French three-factor model plus momentum and adding individual, time, and country as firm fixed effects. We found that only 279 out of the 1584 regressions, representing 17.61%, yielded coefficients with P-values less than 0.05. In Figure 1, we illustrate the frequency of significance across all periods if we had used each score as treatment under TWFE DiD settings. Notably, higher values observed in our correlation matrix tend to correspond to greater significance. Controversies scores are the more powerful to explain returns. Also, our CSR Score ranks among the most relevant. The purpose of this analysis is to demonstrate that our previous results are not a consequence of poor composition or selection of variables for our treatment. Overall, similar results would have been obtained with other CSR-related scores. This provides evidence that CSR scores, in general, are not significant in explaining returns.

In contrast, in Figure 2, we observe the years with the number of significant coefficients. The figure supports partially the findings of the reference paper, we suggests that CSR, although is not generally significant, is more significant during periods of low trust and crisis. In the figure, we note that 2009 stands out as the period with the highest frequency, consistent with the paper's assertions. Following closely is 2011, a year marked by economic crisis in Europe, with Spain on the brink of bankruptcy, and assistance provided to Italy and Portugal, alongside ECB's interventions. In 2022, the Ukraine war began, and there were also high inflation and interest rates crisis and lingering effects from the COVID crisis in China. This data partially lends support to one of the conclusions of

the reference paper, CSR is relevant during low trust periods.

In Figure 2, we didn't observe a higher significance during the COVID period compared to other periods. Other factors, like the type of activity, may have greater relevance in explaining returns. Our focus is primarily on assessing the impact during periods of loss of trust, which aligns with the findings of the reference paper. Despite CSR scores generally lacking significance, they exhibit a slight uptick during crisis periods. However, these findings fall short of supporting the notion that CSR scores are a primary factor explaining returns during low trust periods, a statement of greater relevance.

Table 5: Crisis-Period Returns and CSR Regression TWFE DiD

| <b>VARIABLE</b>               | <b>Returns</b>             | <b>AbReturns</b>           | <b>Returns</b>         | <b>AbReturns</b>       |
|-------------------------------|----------------------------|----------------------------|------------------------|------------------------|
| CSR Score                     | -0.032912<br>(0.054596)    | 0.02494<br>(0.0683)        | -0.01663<br>(0.082347) | 0.037032<br>(0.083827) |
| Idiosyncratic Risk            | -0.001969<br>(0.005124)    | 0.009724<br>(0.006411)     |                        |                        |
| Market Value                  | -0.002492<br>(0.011051)    | -0.016782<br>(0.013825)    |                        |                        |
| Long Term Debt                | -7.745601<br>(10.375802)   | -13.551666<br>(12.980359)  |                        |                        |
| Current Liabilities Total     | 0.004132<br>(0.009687)     | 0.007484<br>(0.012118)     |                        |                        |
| Cash & Short-Term Investments | -0.012146<br>(0.009195)    | 0.001005<br>(0.011503)     |                        |                        |
| Operating Profit Margin       | 0.047149***<br>(0.005137)  | 0.039713***<br>(0.006427)  |                        |                        |
| Book To Market                | 0.012716*<br>(0.00548)     | 0.017465*<br>(0.006856)    |                        |                        |
| Dummy B/M                     | 7.258535<br>(25.30988)     | 57.800639<br>(31.663222)   |                        |                        |
| Momentum                      | -0.611226***<br>(0.004538) | -0.481516***<br>(0.005677) |                        |                        |
| Residuals Median              | -0.53471                   | 0.16975                    | -0.60898               | -0.22813               |
| Total Sum of Squares          | 32030000                   | 33192000                   |                        |                        |
| Residual Sum of Squares       | 14056000                   | 21998000                   |                        |                        |
| R-Squared                     | 0.56115                    | 0.33723                    |                        |                        |
| Adj. R-Squared                | 0.41438                    | 0.11556                    |                        |                        |
| F-statistic                   | 1871.12                    | 744.54                     |                        |                        |

Table 6: Crisis-Period Returns and CSR Standard Regression

| <b>Variables</b>              | <b>Returns</b>               |
|-------------------------------|------------------------------|
| CSR Score                     | 0.0160113*<br>(0.0083280)    |
| Idiosyncratic Risk            | 0.0006632<br>(0.0049954)     |
| Market Value                  | 0.0589512***<br>(0.0052488)  |
| Long Term Debt                | 0.0251412***<br>(0.0049874)  |
| Current Liabilities Total     | 0.0072542<br>(0.0065492)     |
| Cash & Short-Term Investments | 0.0042368<br>(0.0065999)     |
| Operating Profit Margin       | 0.0540766***<br>(0.0050342)  |
| Book To Market                | 0.0136669**<br>(0.0051850)   |
| Dummy B/M                     | 7.8682876<br>(24.7820876)    |
| Momentum                      | -0.6086328***<br>(0.0047746) |
| Residuals Mean:               | -4.24                        |
| R-squared:                    | 0.4644                       |
| Adj. R-squared:               | 0.4641                       |
| F-statistic:                  | 1692                         |

Figure 1: Significance of CSR-related Scores Across 1584 Regression Iterations

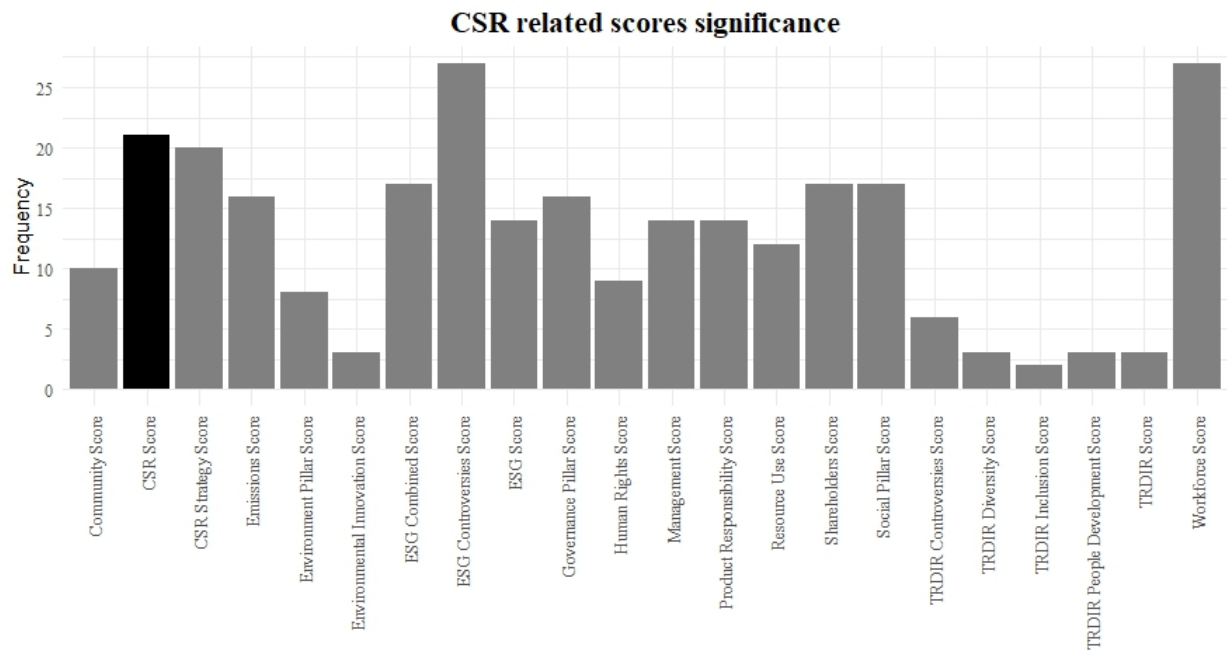


Figure 2: Significance of CSR-related Scores Across 1584 Regression Iterations over time

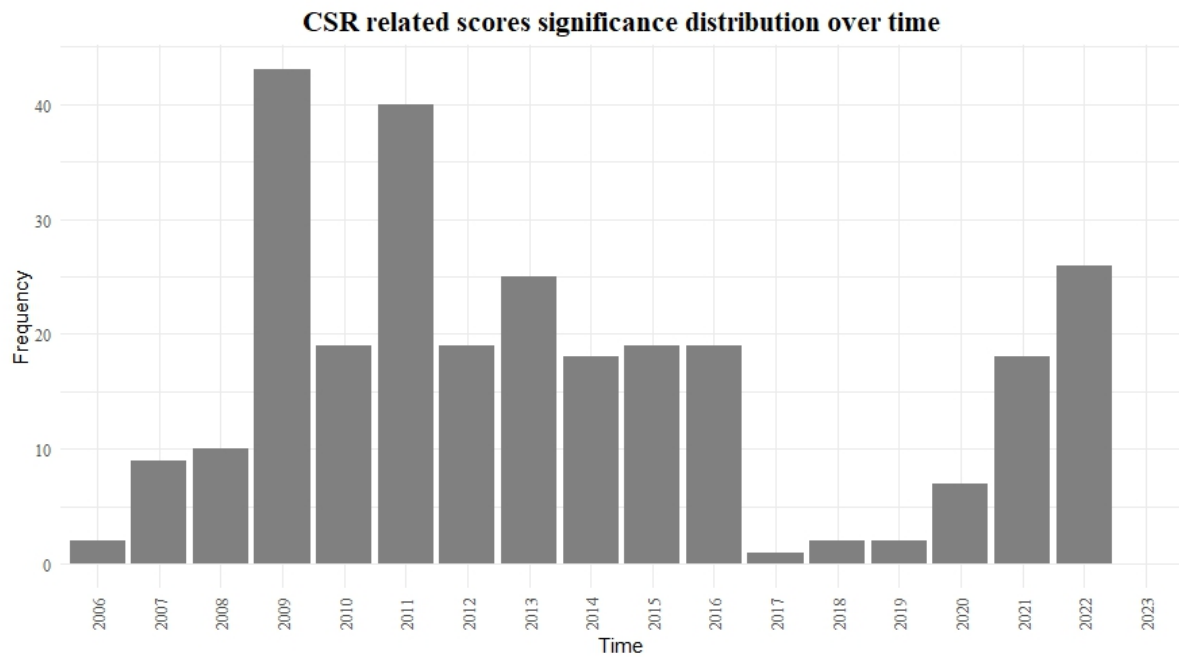


Table 7 presents the same regression that in Table 5 but for a subset of the sample. We replaced our treatment variable with a dummy equal to 1 if the sample unit belongs to the 75th percentile and 0 otherwise. Despite this change, we obtained very similar results in terms of significance. The purpose of this regression was to provide a more relaxed interpretation of the impact of CSR on returns, specifically focusing on companies with high CSR scores. However, the results from this subset regression did not differ significantly from those in Table 5, which represents the regression for the full sample.

In the referenced paper, the authors conducted a similar regression but split the treatment variable into three separate variables, one for each quantile excluding the first one. Despite the similarity in approach, they obtained slightly different results, achieving significance for the third and fourth quantiles while obtaining similar values for the control variables as in the full sample regression. They concluded that companies with higher CSR have a more positive effect on returns.

In contrast, under our settings, we did not find no evidence to support this conclusion. Instead, our analysis suggests that only Operating Profit Margin, Book To Market, and Momentum are relevant in explaining returns during the financial crisis of 2008 in Europe. Notably, the effect is positive for Operating Profit Margin and Book To Market, while Momentum shows a negative impact. In this paper, we've tested all the regression tables with all our CSR-related scores. Only the Product Responsibility Score, Shareholders Score, and Workforce Score exhibit significance for this particular table and only the first two demonstrated a small positive effect, perhaps produced by randomness.

Additionally, the results for abnormal returns mirror those for normal returns, as well as the individual regression with the treatment variables, indicating their lack of significance.

Table 7: Crisis-Period Returns and CSR Quantile Regression TWFE DiD

| <b>VARIABLE</b>               | <b>Returns</b>               | <b>AbReturns</b>              | <b>Returns</b>        | <b>AbReturns</b>     |
|-------------------------------|------------------------------|-------------------------------|-----------------------|----------------------|
| CSR Score                     | -0.2005235<br>(1.8281229)    | 0.84496741<br>(2.2869947)     | -0.05843<br>(2.75857) | 0.94817<br>(2.80816) |
| Idiosyncratic Risk            | -0.0019894<br>(0.0051243)    | 0.009724<br>(0.00641059)      |                       |                      |
| Market Value                  | -0.0026043<br>(0.0110495)    | -0.01670521<br>(0.01382306)   |                       |                      |
| Long Term Debt                | -7.6682397<br>(10.3751092)   | -13.60424432<br>(12.97933498) |                       |                      |
| Current Liabilities Total     | 0.0041258<br>(0.0096868)     | 0.00748827<br>(0.01211823)    |                       |                      |
| Cash & Short-Term Investments | -0.0120651<br>(0.0091942)    | 0.00097876<br>(0.01150199)    |                       |                      |
| Operating Profit Margin       | 0.0471036***<br>(0.0051368)  | 0.03974777***<br>(0.00642623) |                       |                      |
| Book To Market                | 0.0127287*<br>(0.0054803)    | 0.01745049*<br>(0.0068559)    |                       |                      |
| Dummy B/M                     | 7.2503538<br>(25.3101805)    | 57.80770118<br>(31.66321473)  |                       |                      |
| Momentum                      | -0.6112288***<br>(0.0045377) | -0.48151303***<br>(0.0056767) |                       |                      |
| Residuals Median              | -0.53471                     | 0.17655                       | -0.60579              | -0.20288             |
| Total Sum of Squares          | 33192000                     | 33192000                      |                       |                      |
| Residual Sum of Squares       | 14056000                     | 21998000                      |                       |                      |
| R-Squared                     | 0.56114                      | 0.33723                       |                       |                      |
| Adj. R-Squared                | 0.41437                      | 0.11556                       |                       |                      |
| F-statistic                   | 1871.12                      | 744.54                        |                       |                      |

### 3.2 Crisis-Period Returns, CSR and Governance

In Table 8, we introduced the variable 'Governance Pillar Score' as an indicator of the quality of governance within a company, replicating the settings outlined in the reference paper. Interestingly, both our study and the reference paper reach the same conclusion: governance is not a significant factor in explaining stock returns during the financial crisis of 2008.

These results are consistent with our previous findings and reinforce the hypothesis we advocate: CSR scores, or similar metrics, do not have a significant impact on returns. Furthermore, the results for abnormal returns closely resemble those for normal returns, as well as the individual regression with treatment variables, once again demonstrating their lack of significance. The observation that governance score ranked higher than most CSR scores in correlation with returns, but yet remain insignificant in both papers, challenges the validity of the explicit reference paper's claim that CSR is a more significant factor explaining returns than leverage, cash and volatility, while governance has no impact.

The disparity between our paper's findings and those of the reference might stem from various sources: potential imprecision in our dataset or regression methods, the diverse array of countries and companies considered, indeed the reference paper employed a more sophisticated analysis with perhaps higher-quality data. Conversely, the reference paper may suffer out-of-sample validity or data snooping.

Differing regional dynamics could strongly contribute to this discrepancy, making it challenging to provide a definitive explanation about the difference. Nevertheless, our results might align with logical expectations. If CSR indeed impacts returns, it may manifest more prominently in the long-term fluctuations of prices. While the reference paper primarily establishes validity for CSR during low-trust periods, short periods in consequence, another compelling argument lies in CSR's status as one of the key factors explaining returns for low trust periods. During crisis periods, investors sometimes act irrationally, but prioritizing CSR considerations over fundamental financial metrics like cash position, leverage, or profitability when making buy or sell decisions deserve careful consideration. However, the tests conducted in the reference paper appear very robust, including several validity checks within the sample. We consider the reference paper might lack out-of-sample validity, since it doesn't offer much insight into how its findings might generalize outside the data analyzed. There's a possibility of bias on our end as well. Attempting to explain the variance between our results and those of the reference paper, especially after finding no significance in our analysis, could introduce its own form of bias. It's essential to acknowledge this potential bias and approach the interpretation of our findings with caution and objectivity.

Table 8: Crisis-Period Returns, CSR and Governance Regression TWFE DiD

| <b>VARIABLE</b>               | <b>Returns</b>             | <b>AbReturns</b>           | <b>Returns</b>         | <b>AbReturns</b>       |
|-------------------------------|----------------------------|----------------------------|------------------------|------------------------|
| CSR Score                     | -0.05444<br>(0.056007)     | 0.008245<br>(0.07007)      | -0.01663<br>(0.082347) | 0.061885<br>(0.035574) |
| Governance Pillar Score       | 0.041645<br>(0.024199)     | 0.032296<br>(0.030275)     |                        |                        |
| Idiosyncratic Risk            | -0.001866<br>(0.005124)    | 0.009803<br>(0.006411)     |                        |                        |
| Market Value                  | -0.002586<br>(0.01105)     | -0.016855<br>(0.013825)    |                        |                        |
| Long Term Debt                | -7.860287<br>(10.375321)   | -13.640607<br>(12.980566)  |                        |                        |
| Current Liabilities Total     | 0.004169<br>(0.009686)     | 0.007513<br>(0.012118)     |                        |                        |
| Cash & Short-Term Investments | -0.011743<br>(0.009197)    | 0.001318<br>(0.011507)     |                        |                        |
| Operating Profit Margin       | 0.047175***<br>(0.005137)  | 0.039733***<br>(0.006427)  |                        |                        |
| Book To Market                | 0.012631*<br>(0.00548)     | 0.017398*<br>(0.006856)    |                        |                        |
| Dummy B/M                     | 7.258652<br>(25.308184)    | 57.800729<br>(31.663073)   |                        |                        |
| Momentum                      | -0.611164***<br>(0.004537) | -0.481469***<br>(0.005677) |                        |                        |
| Residuals Median              | -0.55647                   | 0.18078                    | -0.60898               | -0.61757               |
| Total Sum of Squares          | 32030000                   | 33192000                   |                        |                        |
| Residual Sum of Squares       | 14053000                   | 21997000                   |                        |                        |
| R-Squared                     | 0.56124                    | 0.33728                    |                        |                        |
| Adj. R-Squared                | 0.41446                    | 0.11557                    |                        |                        |



### 3.3 Crisis-Period Returns and CSR during the crisis of COVID-19

In Table 9, we replicate the analysis conducted in Table 5, employing a Two-Way Fixed Effects (TWFE) DiD approach while controlling for controlling for the Fama-French three-factor model plus momentum and adding individual, time, and country as firm fixed effects spanning from Q1 2020 to Q4 2021. The objective is to explore whether the lack of significance in CSR scores persists during other crisis periods, such as the COVID-19 pandemic. Given the distinct nature of the COVID crisis compared to that of 2008, it's reasonable to consider it as a valid period for comparison.

Interestingly, we observe divergent results in terms of significance. Market Value and Long-Term Debt emerge as significant factors in explaining returns. Specifically, Long-Term Debt exhibits a negative effect on returns, while Market Value and Operating Margin demonstrate positive effects, albeit with Momentum showing a negative impact. These findings seem consistent with expectations given the context of the COVID-19 crisis. Notably, the CSR score remains non-significant, consistent with our initial hypothesis. We believe that other factors may carry more significance due to the unique circumstances of the COVID-19 pandemic. In particular, the presence of a loss of trust in the system may not be as prominent of an issue compared to other crises.

Moreover, when examining abnormal returns, the regression outcomes differ from those observed for normal returns. Long-Term Debt's significance fluctuates, and Book to Market displays significance with abnormal returns. We can observe that Long-Term Debt holds considerable influence on returns during this period. The halt in economic activity has led to severe cash flow disruptions for companies, necessitating debt refinancing and asset liquidation to mitigate financial strain. Once again, the individual regressions of the treatment variables fail to attain significance, in line with our anticipated outcomes.

In the reference paper, researchers checked if their findings held true during the 2001 crisis, which strengthened their argument about the factors influencing returns during the 2008 crisis and low trust periods. By showing their results applied to different crisis periods, they made their conclusions more reliable and relevant.

Table 9: COVID Crisis-Period Returns and CSR Regression TWFE DiD

| <b>VARIABLE</b>               | <b>Returns</b>             | <b>Abnormal</b>            | <b>Returns</b>          | <b>Abnormal</b>         |
|-------------------------------|----------------------------|----------------------------|-------------------------|-------------------------|
| CSR Score                     | -0.010343<br>(0.009002)    | -0.017087<br>(0.010009)    | -0.010521<br>(0.013392) | -0.017876<br>(0.012764) |
| Idiosyncratic Risk            | 0.000748<br>(0.00398)      | 0.001615<br>(0.004425)     |                         |                         |
| Market Value                  | 0.027786***<br>(0.007086)  | 0.026077***<br>(0.007879)  |                         |                         |
| Long Term Debt                | -2.977237***<br>(0.863379) | -1.958563*<br>(0.959981)   |                         |                         |
| Current Liabilities Total     | 0.007486<br>(0.007034)     | 0.00563<br>(0.007821)      |                         |                         |
| Cash & Short-Term Investments | -0.004579<br>(0.005312)    | -0.004632<br>(0.005906)    |                         |                         |
| Operating Profit Margin       | 0.064379***<br>(0.00397)   | 0.052701***<br>(0.004414)  |                         |                         |
| Book To Market                | -0.004906<br>(0.003933)    | -0.009476*<br>(0.004374)   |                         |                         |
| Dummy B/M                     | -13.618254<br>(18.446975)  | 35.875746<br>(20.510964)   |                         |                         |
| Momentum                      | -0.681942***<br>(0.003128) | -0.548556***<br>(0.003478) |                         |                         |
| Residuals Median              | -2.1004                    | -0.22818                   | -0.83851                | -0.77568                |
| Total Sum of Squares          | 133240000                  | 121040000                  |                         |                         |
| Residual Sum of Squares       | 59012000                   | 72956000                   |                         |                         |
| R-Squared                     | 0.55711                    | 0.39728                    |                         |                         |
| Adj. R-Squared                | 0.50154                    | 0.32164                    |                         |                         |
| F-statistic                   | 4910.67                    | 2573.12                    |                         |                         |

## 4 Conclusions

Our paper has certain limitations that we have commented on throughout. The wide scope of our sample frame poses challenges, particularly regarding causality inference. It's essential for the groups being compared to be similar itself or similar after controlling for observable characteristics, but we neither control for all observable characteristics nor consider that unobserved heterogeneity remains constant over all periods. To ensure that the linear regression estimator of the conditional expectation of the returns correctly estimates the returns and that the coefficient of the treatment variable reflects the treatment effect, it is ideal for the controls to be independent of the treatment variable. However, in practice, there can be mixed directions of causality, complicating this relationship.

This challenge is compounded when dealing with companies from multiple countries, as the timing and impact of crises and trust loss may vary. Even after controlling for country and time, the dynamics within European countries might not be well captured in this way. However, the inclusion of a broader sample frame enhances the external validity of our results at the expense of complexity. Additionally, the treatment variable's continuous nature and the absence of proper control groups increase the difficulty of inferring causality. Our lack of sophistication and controls in activity may have influenced our findings. Nonetheless, comparing regressions with and without fixed effects in Tables 5 and 6 suggests that might favor redundant variables significance. The quality of our data may be inferior to that used in the reference paper, which has a smaller, more manageable sample size for data cleaning and relevance.

On the other hand, our big scale regression analysis suggests strong evidence of the lack of significance of CSR activities in influencing company returns. We conclude that CSR scores are not generally significant for predicting or explaining returns during low trust periods or otherwise. We partially agree with the reference paper, as we find that although CSR-related scores are not generally significant, they tend to show a slight increase during periods of crisis. However, we have not found evidence to support the statements made in the reference paper that companies with higher CSR scores have higher returns. Furthermore, we do not have evidence to support the claim that CSR scores are not only significant but also the main factor explaining returns during low trust periods. Our correlation matrix also demonstrates a weak correlation between returns and CSR-related scores, mirroring the findings of the reference paper, which revealed a stronger correlation with the variables under study, particularly their CSR score.

The differing dynamics between the US and Europe likely play a significant role in the divergent results found. Our study focuses on the returns of companies, which exhibit markedly different behaviors between Europe and the US.

It's probable that the market capitalization of our sample units is much smaller than that used in the referenced paper, which unfortunately doesn't offer much insight into this aspect. In general, companies listed in the main indexes of the US tend to be larger in size.

Mainly driven by our extensive and thorough regression analysis, this paper could make a valuable contribution to academic literature, with probably a focus on quantity rather than the depth of the analysis. We believe that the evidence we present is reasonably acceptable and adds to our understanding of the impact of Corporate Social Responsibility (CSR) on firm performance. This topic holds particular significance in today's economies, where ethical considerations are increasingly prevalent.

We believe that our study could be enhanced by conducting a more granular analysis, examining the effects of CSR on firm performance on a country-by-country and period-by-period basis. This opens up avenues for further research to delve deeper into the nuances of CSR impact across various national contexts and to assess how these effects evolve over time. Such an approach could provide valuable insights into the specific mechanisms through which CSR practices influence firm performance and uncover any regional or temporal variations that may exist but we that have not been able to provide.

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