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Kindness is rewarded! The impact of corporate social responsibility on Chinese market reactions to the COVID-19 pandemic

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Abstract
This study takes the COVID-19 outbreak as a quasi-natural experiment to investigate whether corporate social responsibility (CSR) performance can help firms mitigate drops in their share prices. The results show that CSR ratings are positively associated with cumulative abnormal return (CAR) during the COVID-19 outbreak periods. Further, the positive role of CSR is more significant for non-state-owned enterprises (non-SOEs) and those located in regions with lower levels of marketization.

1. Introduction
The COVID-19 outbreak that started spreading globally in early 2020 had a significant negative impact on capital markets. However, did this pandemic affect firms in the stock market differently? Additionally, we investigate whether and how does corporate social responsibility (CSR) affect firms’ value? This question is of academic and practical significance. We therefore study whether and how CSR performance affects stock-price responses to negative events with this background.

Prior empirical research is controversial on whether CSR is positive or negative for companies. According to the stakeholder theory, CSR contributes to corporate financial performance. In support of this thesis, prior researches point out that CSR performance enhances a firm's reputation and social capital, thereby leading investors to trust the firm, providing an insurance-like effect (Godfrey et al., 2009; Pevzner et al., 2015; Lins et al., 2017). Cheng et al. (2014) indicated that CSR performance has a signaling effect that reduces information asymmetry. Conversely, the agency theory posits that managers engage in CSR activities rather than devoting their efforts to shareholder wealth maximization, because they can extract private benefits (Friedman, 1970). Accordingly, prior studies pointed out that CSR investments may have a negative association with financial performance (Barnett and Salomon, 2006; Surroca et al., 2010). The reason for this controversy is endogeneity. To solve the endogeneity problem behind this controversy, the COVID-19 outbreak-induced market crash, as a negative exogenous shock, creates a unique opportunity to test the notion that CSR protects firm value during crisis periods.

This study finds that CSR ratings have a positive effect on firms’ stock returns during the pandemic period. Furthermore, the positive role of CSR is more significant for firms located in regions with lower levels of marketization. Finally, this positive effect of CSR on cumulative abnormal return (CAR) is, in the short-term, greater for non-state-owned enterprises (non-SOEs) than state-owned enterprises (SOEs).

The contributions of this study are as follows: First, on the controversial issue of how CSR affects market reaction, we chose the COVID-19 outbreak as a quasi-natural experiment to provide new evidence to address endogeneity. Second, we use CSR ratings provided by Hexun, which is the most comprehensive social responsibility rating database available for listed companies. Third, we explore the mechanism of how CSR affects CAR, and selected the marketization index of the firm’s registered location and ownership structure as the moderating variables. Lastly, this study deepens the understanding of the market impact of the COVID-19.

The rest of this article is structured as follows: Section 2 describes the data and model setting; Section 3 reports empirical results, and the last section is conclusion.

2. Data and methodology
2.1. Data source and sample identification
We collected accounting data and stock returns about listed companies from CSMAR database. According to the research needs, we deal with our original data as follows: (1) observations with missing values were deleted; (2) firms in the financial industry are also eliminated; (3) companies listed after 2018 were excluded.
2.2. Model and measures

CAR is the dependent variable. The market models are the most commonly used and have good predictive power (Brenner, 1979). In our study, we used the market model below to calculate firm abnormal returns:

\[ R_{it} = \alpha + \beta R_{m,t} + \varepsilon, \quad t \in (-150, -30) \] (1)

where, \( R_{it} \) is the return rate of stock \( i \) on the trading day \( t \), \( R_{m,t} \) is the market return of the trading market.

As shown in Eq. (1), we use the estimation window of \([-150, -30]\) to estimate market betas. We then use those betas to calculate the firm’s abnormal returns (AR) and cumulative abnormal returns (\( \text{CAR}[-n, n]_{i,t} \)) around the event of the Covid-19 outbreak. We choose January 23, 2020 as the event day, when the Chinese government officially announced the lockdown of Wuhan. Specifically, the calculation of \( \text{CAR}[-n, n]_{i,t} \) is shown in Eq. (2) below:

\[ \text{CAR}[-n, +n]_{i,t} = \sum_{t=-n}^{+n} AR_{i,t} = \sum_{t=-n}^{+n} (R_{i,t} - \bar{\alpha} \bar{R}_{m,t}) \] (2)

where \( AR_{i,t} \) refers to the abnormal returns of firm \( i \), on a given event day; \( \text{CAR}[-n, +n]_{i,t} \) is the CAR of firm \( i \). \( \bar{\alpha} \) is the estimated constant in Eq. (1) and \( \hat{\beta} \) is the estimated coefficient of \( R_{m,t} \). Fig. 1 shows the daily abnormal returns of the Chinese stock market around the event day.

CSR performance is the independent variable, which we selected CSR ratings of listed companies published by Hexun.com, as a proxy variable of CSR performance. Based on the annual reports of listed companies, Hexun measures CSR performance across four dimensions: shareholder, employee, environmental, and social responsibility, and get a total score of 100. The primary reason for choosing the Hexun CSR data is that they include almost all listed companies, which is the most comprehensive third-party social responsibility rating agency in China.

The benchmark model is as follows:

\[ \text{CAR}[-n, +n]_{i,t} = \alpha_0 + \alpha_1 \text{CSRSCORES}_i + \sum \beta_j \text{CONTROL} + \sum \beta_j \text{Industry fixed effects} + \varepsilon \] (3)

where, \( \text{CAR}[-n, +n]_{i,t} \) is the CAR of firm \( i \) in the event window period \([-n, +n]\), \( \text{CSRSCORES}_i \) refers to the CSR rating of firm \( i \) in 2019 from Hexun. The control variables include: return on equity (ROE), the total liabilities divided by total assets (LEV), the growth rate of the firm’s operating income (GROWTH), the natural logarithm of sales revenue (Size), the percentage of corporate shares held by the largest shareholder (OWN1), a dummy variable equal 1 if the CEO is also Chairman of the board of director and 0 otherwise (DUAL), the natural logarithm of the number of directors on the board (BOARD), the percentage of independent directors on the board (INDRATIO), and the natural logarithm of years that the firm was established (InLISTNF). We also control industry-fixed effects. We choose 3-, 5-day event windows around the Wuhan lockdown.

3. Empirical results

3.1. Descriptive statistics

Table 1 shows the descriptive statistics of our main variables. The means of \( \text{CAR}[-3, +3] \) and \( \text{CAR}[-5, +5] \) are \(-0.0184\) and \(-0.0137\), respectively, indicating that the market reaction is negative after the announcement of the Wuhan lockdown. The average of CSR rating is 19.9411, which indicates that most of CSR scores belong to category D according to the standard of HeXun.

| Variable       | Mean   | p50    | SD    | Min   | Max   | N    |
|----------------|--------|--------|-------|-------|-------|------|
| CAR[-3,+3]     | -0.0184| -0.0438| 0.1220| -0.2300| 0.4600| 2,999,000 |
| CAR[-5,+5]     | -0.0137| -0.0439| 0.1361| -0.2534| 0.4937| 2,999,000 |
| CSR scores     | 19.9411| 21.6200| 8.9785| -13.8400| 41.0300| 2,998,000 |
| ROE            | 0.0586 | 0.0718 | 0.1499| -0.9415 | 0.3466| 2,999,000 |
| LEV            | 0.4149 | 0.4085 | 0.1936| 0.0644 | 0.8665| 2,999,000 |
| GROWTH         | 0.3546 | 0.1211 | 0.9535| -0.6721 | 7.0982| 2,999,000 |
| SIZE           | 22.2716| 22.0990| 1.3031| 19.9883| 26.2193| 2,999,000 |
| OWN1           | 34.2290| 32.2600| 14.1766| 9.3300| 73.0600| 2,999,000 |
| BOARD          | 3.1011 | 0.0000 | 0.4588| 0.0000 | 1.0000| 2,999,000 |
| INDRATIO       | 3.7771 | 3.6363 | 0.0532| 0.3333| 0.5714| 2,999,000 |
| InLISTNF       | 2.4811 | 2.4849 | 0.6049| 1.3863 | 3.4012| 2,999,000 |

Fig. 1. Abnormal returns in the ten days around the Wuhan lockdown.
Table 2
Pearson correlation matrix.

|          | CAR[−3,+3] | CAR[−5,+5] | CSRscores | ROE | LEV | GROWTH | SIZE | OWN1 | DUAL | BOARD | INDRATIO | lnlistnf |
|----------|------------|------------|-----------|-----|-----|--------|------|------|------|-------|----------|----------|
| CAR[−3,+3] | 1          |            |           |     |     |        |      |      |      |       |          |          |
| CAR[−5,+5] | 0.916***   | 1          | 0.083***  | 0.044** | −0.056*** | −0.046** | 0.056*** | −0.03 | 0.024 | 0.003 | −0.013 | 0.058*** |
| CSRscores | 0.083***   | 1          | 0.084***  | 0.035* | −0.059*** | −0.041** | 0.128*** | 0.183*** | 0.042** | 0.034* | −0.171*** | 0.044** |
| ROE      | −0.056***  | −0.059***  | −0.162*** | −0.132*** | 0.001     | 0.02     | 0.011   | 0.011 | −0.144*** | −0.024 | −0.218*** | −0.019   |
| LEV      | 0.916***   | 1          | 0.084***  | 0.035* | −0.059*** | −0.041** | 0.128*** | 0.183*** | 0.042** | 0.034* | −0.171*** | 0.044** |
| GROWTH   | 0.044**    | 0.035*     | 0.309***  | 1     | 0.02    | 0.081*** | 1      |      |      |       |          |          |
| SIZE     | −0.056***  | −0.059***  | −0.162*** | −0.132*** | 0.001     | 0.02     | 0.011   | 0.011 | −0.144*** | −0.024 | −0.218*** | −0.019   |
| OWN1     | 0.024      | 0.023      | 0.042**   | 0.011 | −0.144*** | −0.024 | 0.170*** | 0.04 |      |       |          |          |
| DUAL     | 0.003      | 0.004      | 0.034*    | 0.057*** | 0.132*** | −0.012 | 0.271*** | 0.012 |      |       |          |          |
| BOARD    | −0.013     | −0.004     | −0.011    | −0.018 | −0.002 | 0.032* | −0.027 | 0.037** | 0.126*** | −0.578*** |          |
| INDRATIO | 0.058***   | 0.044**    | −0.171*** | −0.058*** | 0.306*** | 0.080** | 0.485** | 0.055*** | −0.279*** | 0.184*** | −0.034* |
| lnlistnf | 0.0013***  | 0.0007     | 0.0017*** | 0.0006  |          |        |        |      |       |          |          |
|           | (5.7078)   | (4.6317)   | (6.1076)  | (5.0484) |          |        |        |      |       |          |          |

Table 3
The impact of CSRs scores on stock market reaction to COVID-19.

|          | (1) CAR[−3,+3] | (2) CAR[−3,+3] | (3) CAR[−5,+5] | (4) CAR[−5,+5] |
|----------|---------------|---------------|---------------|---------------|
| CSRscores| 0.0014***     | 0.0013***     | 0.0017***     | 0.0016***     |
|          | (5.7078)      | (4.6317)      | (6.1076)      | (5.0484)      |
| ROE      | −0.0021       | −0.1305       | −0.0435**     | −2.9608       |
|          | (−10.360)     | (−2.9608)     | (−2.9608)     | (−2.9608)     |
| LEV      | −0.0435**     | −2.9608       | −0.0435**     | −2.9608       |
|          | (−2.9608)     | (−2.9608)     | (−2.9608)     | (−2.9608)     |
| GROWTH   | −0.0027       | −1.1353       | −0.0030       | −1.1217       |
|          | (−1.1353)     | (−1.1353)     | (−1.1353)     | (−1.1353)     |
| SIZE     | 0.0135***     | 0.1444***     | 0.0144***     | 0.1444***     |
|          | (5.6153)      | (5.3414)      | (5.3414)      | (5.3414)      |
| OWN1     | −0.0002       | −0.0002       | −0.0002       | −0.0002       |
|          | (−2.824)      | (−2.824)      | (−2.824)      | (−2.824)      |
| DUAL     | 0.0101        | 0.0090        | 0.0090        | 0.0090        |
|          | (1.8128)      | (1.6158)      | (1.6158)      | (1.6158)      |
| BOARD    | −0.0228       | −0.0178       | −0.0178       | −0.0178       |
|          | (−1.5951)     | (−1.1133)     | (−1.1133)     | (−1.1133)     |
| INDRATIO | −0.0637       | −0.0447       | −0.0447       | −0.0447       |
|          | (−1.2562)     | (−0.7882)     | (−0.7882)     | (−0.7882)     |
| lnlistnf | 0.0151***     | 0.0154**      | 0.0154**      | 0.0154**      |
|          | (3.4111)      | (3.1172)      | (3.1172)      | (3.1172)      |

Table 4
The moderating effect of marketization in the relationship between CSR and CAR.

|          | (1) low marketization regions | (2) high marketization regions | (3) low marketization regions | (4) high marketization regions |
|----------|-------------------------------|--------------------------------|-------------------------------|--------------------------------|
| CSRscores| 0.0011**                     | 0.0007                         | 0.0013**                     | 0.0008                         |
|          | (2.9682)                     | (1.6300)                      | (3.2831)                     | (1.6864)                      |
| Constant | −0.2215**                    | −0.1580                       | −0.2449**                    | −0.1819                       |
|          | (−3.0128)                    | (−1.7563)                     | (−2.9833)                    | (−1.8058)                     |
| Control variables | Yes                         | Yes                            | Yes                           | Yes                            |
| Observations | 1.512                       | 1.483                          | 1.512                         | 1.483                          |
| R-squared  | 0.0232                       | 0.0259                         | 0.0211                        | 0.0208                         |
| industry FE | YES                         | YES                            | YES                           | YES                            |

Standard errors in parentheses
*** p < 0.01, ** p < 0.05, * p < 0.1

3.2. Pearson correlation analysis

Table 2 reports the Pearson correlation analysis of the variables used in the study. CSR shows a significantly positive correlation with CAR[−3,+3], CAR[−5,+5]. In addition, the coefficients of the pairwise correlations among the control variables are generally low, as expected, indicating that no multicollinearity problem exists when we include these control variables in the regression model simultaneously.

3.3. The impact of CSR scores on stock market reaction to COVID-19

Table 3 presents the main results. As columns 1 and 3 show, the coefficients of the 3- and 5-days event window are 0.0014 and 0.0017, respectively, and statistically significant at the 1% level. After adding the control variables, the coefficients in columns 2 and 4 are 0.0013 and 0.0016, respectively, and statistically
significant at the 1% level. This finding suggests that CSR performance alleviates the negative stock price effect of COVID-19, and therefore may be viewed as providing insurance-like protection and a signaling effect (Godfrey et al., 2009; Cheng et al., 2014).

3.4. Further analysis

Previous researches pointed out that CSR performance is related to market characteristics (Jha and Cox, 2015). Furthermore, a region's institutional environment affects listed firms' performance because information asymmetry should be more serious in low marketization regions (McGuire et al., 2012). In this section, we test whether CSR can provide a signaling effect to alleviate information asymmetry with different level of marketization. We use Fan et al. (2011)'s marketization index as a proxy, which represent regional difference in the market development level (Jian and Wong, 2010). Then, we divide the sample into high and low based on the median marketization index of a firm's registered location. Table 4 reports the results. Columns 1 and 3 report that the coefficients of firms in low marketization regions, which are 0.0011 and 0.0013, respectively, and statistically significant at the 1% level. Columns 2 and 4 show that the coefficients of firms in high marketization regions are positive, but statistically insignificant at the 1% level. These results support our hypothesis that CSR can alleviate information asymmetry.

One unique feature of Chinese listed firms is that non-SOEs have a different regulatory environment, management philosophy, and financial performance compare with SOEs. (Du et al., 2014; Jian and Wong, 2010). Non-SOEs have more pressure on financing and more serious regulatory environment than SOEs during the COVID-19. Furthermore, we hypothesize that non-SOEs needed signaling effect and insurance-like effect of CSR more to alleviate a negative shock than did SOEs during the pandemic period. To compare the different effect of CSR on CAR for SOEs and non-SOEs, we divided sample into two groups and conducted regression. Table 5 reports the results. Column 1 and 3 reported the results for SOEs, and Column 2 and 4 report the results for non-SOEs. The coefficients of non-SOEs are 0.0010 and 0.0012, and statistically significant. The coefficients of SOEs are 0.0008 and 0.0010, but statistically insignificant. The coefficients of SOEs are lower than the coefficients of non-SOE in 3- and 5-event windows. The results can be explained that CSR had more significant effect on the stock prices of non-SOEs than those of SOEs (Qiao et al., 2021).

3.5. Robustness test

We alternate event window of the independent variable to conduct robustness test. The regression results are shown in Table 6. CSR scores are positively associated with CAR over the 2-, 4-, and 6-day event windows-around the event day. These results are consistent with the previous regression. Therefore, the positive effect of CSR scores on CAR are still valid. Furthermore, we also alternated the dependent variable by calculating the average CSR rating from 2017 to 2019 to conduct a robustness test. The regression results are shown in Table 7. CSR mean scores are positively associated with CAR. These results are still robust.
3.6. Analysis of listed firms required to disclose CSR

The Shanghai Stock Exchange (SSE) mandates the constituent firms of the SSE corporate governance index, firms cross-listed overseas, and financial firms to disclose annual CSR reports. Meanwhile, the Shenzhen Stock Exchange (SZSE) mandates the constituent firms of the SZSE 100 index to disclose such reports. According to these requirements, a total of 335 firms in our sample are mandated to make CSR disclosures.

As suggested by the reviewer, we use as observations the above mentioned firms only to check the robustness of our empirical findings in the previous manuscript. We report the related regression results in Table 7 below. Please refer to the manuscript for the definitions of the variables. As shown in Table 7, the coefficients of CSR2019 are significantly positive in all settings. These results are qualitatively identical to the results reported in the previous manuscript, implying that our finding regarding the positive impact of CSR scores on stock returns during the COVID-19 outbreak is robust.

3.7. Further analysis of CSR subcategories

We measure CSR activities of Chinese A-share firms with CSR scores evaluated by the Hexun.com. The Hexun.com constructs CSR scores with three subcategories including shareholder responsibility, employee responsibility and social responsibility. That is, the Hexun.com does not provide scores on firms’ environmental awareness. A possible reason is that the China Securities Regulatory Commission (CSRC) did not require listed firms to add an “Environment and Social Responsibility” section in their semi-annual and annual reports until 2021. Nevertheless, we studied the impact of each CSR subcategory on stock returns as suggested by the reviewer.

We regress CAR on the three CSR rating subcategories in Table 8. As column (1) and column (4) show, the coefficients of shareholder responsibility are positive and significant. Higher shareholder responsibility ratings imply consistent performance well in profit growth, debt repayment, and innovation investment. Columns (3) and column (6) report that the coefficients of social responsibility are positive and significant. To score high social responsibility, a firm should have performed well in income tax to total profit ratio and Charitable donation. The coefficients of employee responsibility are statistically insignificant. Strong employee responsibility scores imply consistent performance in employee benefits, employee training, and safety training. The results in Table 8 suggest that shareholder responsibility and social responsibility of CSR rating have significantly positive effects on CAR during the crisis. However, employee responsibility has an insignificant effect on CAR.

Therefore, shareholder responsibility and social responsibility of CSR are most important for protecting a firm’s value during crisis breakouts. Higher scores in shareholder responsibility and social responsibility should help ensure overall financial stability and good reputation of a firm and offer a heightened resilience to shock events, including COVID-19 (see Table 8).

4. Conclusion

This study provides new evidence that CSR did affect market reactions to the COVID-19 pandemic. We found that CSR ratings are positively associated with stock returns in short-term. These results support that the insurance-like effects and signaling effects of CSR during negative shocks. Furthermore, we compare the role of CSR in regions with different level of marketization. The results show that the positive role of CSR is more significant in low marketization region and support the signaling effect of CSR. Further, we compare the role of CSR according to ownership structure. The results show that the insurance effect and signaling effect of non-SOE’s CSR is more significant than the SOE in the short-term. This paper extends the literature on the effect of CSR on companies’ performance and the effect of the COVID-19 breakouts on economics and finance. Our findings also deepen the understanding of the relationship between CSR and market reactions during dramatic public health shocks.

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