The impact of COVID-19 on seasoned equity offering: Evidence from China

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Abstract
This study examines the impact from the COVID-19 pandemic on the association between Chinese firms’ SEO announcements and market reaction afterwards. Our findings indicate that market investors would respond more negatively to the SEO announcements and undergo more SEO underpricing for firms from regions significantly affected by the pandemic than those from the less-affected regions. Furthermore, higher CSR scores and more involvements in accounting conservatism could mitigate these effects. The main mechanism of the moderating effect from CSR performance and accounting conservatism is that CSR investment and accounting conservatism could lessen information asymmetry between the SEO announced firms and outside investors. Finally, we document that the main motivation of SEO issuance during the pandemic is market timing.

1 INTRODUCTION
The COVID-19 pandemic impacted China’s stock market severely. Specifically, the stock prices of firms from areas significantly affected by the pandemic plunged dramatically (Ding, Fan, & Lin, 2020; Huo & Qiu, 2020), given the likelihood of financial stress or illiquidity issues (Ruiz Estrada, Koutronas, & Lee, 2020). Haroon and Rizvi (2020) further echo that regions affected by the pandemic could suffer from massive media-driven panic, which aggravates the investment environment uncertainty and causes larger market volatility for firms. Apart from the location, Corbet, Hou, Hu, Lucey, and Oxley (2020) find that companies or products containing words related to “Corona” experienced diminishing stock returns and trading volumes. Akhtaruzzaman, Boubaker, and Sensoy (2020) also note that financial firms experienced more
effects of the pandemic relative to other firms. It seems that all affected firms must deal with liquidity constraints during and after the pandemic.

Seasoned equity offerings (SEOs), a common way to raise capital and alleviate the liquidity constraints for listed firms, are usually motivated by market timing to help firm financial requests (Bo, Huang, & Wang, 2011). Thus, raising capital through an SEO to address financial needs seems to be a reasonable alternative. Despite the growing literature associating the pandemic to the financial market, there are surprisingly few studies on the impact of COVID-19 on firm-capital-raising activities, particularly via SEOs. Investigating fund-raising activities through public offerings for firms affected by pandemics and other firm characteristics that might moderate this effect provides an intriguing avenue for research. Thus, this study focuses on public offerings (SEOs) for the following four reasons. First, SEOs are frequent and important corporate-capital-raising events, and research on SEOs in China is limited. Second, while firm-specific and macroeconomic characteristics affect the likelihood of an SEO (Bayless & Chaplinsky, 1991), SEO announcements are largely unanticipated, which can mitigate reverse causality problems associated with studies of the relationship between corporate social responsibility (CSR) activities and firm value (Deng, Kang, & Low, 2013; Feng, Chen, & Tseng, 2018). Third, prior literatures have recognized the information signaling of the SEO announcement effects of the firm information environment and corporate governance practices (e.g., Booth & Chang, 2011; Feng et al., 2018; Boulton, Smart, & Zutter, 2017). On the other hand, SEO underpricing has been widely considered as a signal of firm quality (Altinkılıç & Hansen, 2003), risks (Lowry & Shu, 2002), and the cost of raising equity capital (e.g., Bowen, Chen, & Cheng, 2008; Diamond & Verrecchia, 1991). Because the COVID-19 pandemic has made a significant impact on the information environment of the listed firms, we focus on SEO announcement effects and underpricing to investigate the impact of the COVID-19 pandemic on the affected firms based on the perceptions from market investors and the cost of raising equity capital. Fourth, Bo et al. (2011) indicate that Chinese SEOs are mostly motivated by market timing, rather than financing for investment and growth, which is also consistent with the findings of trend of SEO behaviors around the world (Baker & Wurgler, 2002; Cohen, Papadaki, & Siougle, 2007; DeAngelo, DeAngelo, & Stulz, 2010). Their results show that Chinese listed firms issue SEOs when there are opportunities to take advantage of market overvaluation. Moreover, Corbet et al. (2020) and Haroon and Rizvi (2020) conclude that the pandemic-affected firms must face more financial difficulties and investment uncertainties in the market, which make these firms' advantage of market overvaluation hardly exploited. Therefore, it is intriguing to investigate how the pandemic influences SEO announcements, how CSR and accounting conservatism moderate this influence, and what is the main SEO motivation during the pandemic.

This study examines the market reaction after the announcements of SEOs, particularly after the COVID-19 outbreak in China. Our findings indicate that market investors would respond more negatively to SEOs announced by firms from regions significantly affected by the pandemic than those from the less-affected regions. Further, SEOs by firms with higher CSR scores exhibit fewer losses in firm values during the pandemic period. Moreover, negative market reactions to SEO announcements could also be mitigated by accounting conservatism practices. Additionally, SEOs by firms located in significantly affected provinces experience more underpricing relative to their counterparts. Further estimations show that SEOs by firms with a CSR-investment focus and accounting conservatism engagement show less underpricing. The main mechanism of the moderating effect of CSR performance and accounting conservatism on the negative market reaction and underpricing of SEOs is that CSR investment and
accounting conservatism could lessen information asymmetry between SEO firms and outside investors. Additionally, we find that firms located in more severely affected provinces are less motivated to issue SEOs in the market than their counterparts and SEO announcements are supported by higher CSR scores and greater involvement of accounting conservatism. Finally, we conclude that the motivation of Chinese SEO issuance during the pandemic is mainly market timing rather than financing for investment and growth, as the common SEO practices in China. It is because the firms from higher affected areas are hardly overvalued during the pandemic because investors are uncertain about their financial situations.

This study contributes to the existing literature as follows. First, we complement the current SEO literature by providing evidence from Chinese firms. Prior studies on the effects of seasoned equity issues focus mainly on the US market. For example, many studies record consistent negative abnormal returns on equity value when public offerings are announced in US stock exchanges (Asquith & Mullins, 1986; Jung, Kim, & Stultz, 1996; Masulis & Korwar, 1986; Mikkelsen & Partch, 1986; Myers & Majluf, 1984; Smith Jr., 1977). However, few studies examine Chinese SEOs. For example, Huang and Song (2006) conclude that Chinese firms mainly use equity financing, in particular SEOs, as a channel to raise external capital. Moreover, Zou and Xiao (2006) believe that Chinese listed firms have built-in incentives to raise equity due to tight SEO and agency problem regulations. This study is among the first studies to examine the impact of market reactions to Chinese SEO announcements and the moderating effect of CSR and accounting conservatism on firms that issued SEOs after a negative exogenous shock, such as the COVID-19 outbreak in China. We also explore the mechanism of the SEO announcement during pandemics based on information asymmetry because the firms from regions significantly affected by the pandemic experience a higher level of information asymmetry and information asymmetry can significantly influence SEO announcement returns (Booth & Chang, 2011) and underpricing (Corwin, 2003).

Second, we contribute to the current literature by examining the impact of COVID-19 on Chinese listed firms’ issuance of SEOs. Existing pandemic studies mainly focus on the impact of COVID-19 on the macroeconomy (Baker et al., 2020; Guerrieri, Lorenzoni, Straub, & Werning, 2020), financial markets (Alfaro et al., 2020; Haroon & Rizvi, 2020; Ruiz Estrada et al., 2020), firm performance (Akhtaruzzaman et al., 2020; Corbet et al., 2020), and household consumption (Chen, Qian, & Wen, 2020). This study is among the few studies that examine firms’ valuation, caused by capital-raising actions under the uncertain pandemic crisis. Explicitly, it emphasizes how the regional pandemic severity, such as COVID-19 death cases, would influence estimations and how moderating factors, such as CSR and accounting conservatism, moderate this relationship. This study is also among the first to examine the motivation of SEO issuance during pandemic periods.

The remainder of this paper is structured as follows. Section 2 provides a detailed literature review and hypothesis development. Section 3 explains the data summary and research models. Section 4 discusses the main economic mechanism and results. Section 5 presents a robustness check. Section 6 concludes.

2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The extant literature on the return on SEOs remains mixed. Empirical evidence from Altinkılıç and Hansen (2003) and Lease, Masulis, and Page (1991) identify significant positive SEO initial-
day returns. However, Masulis and Korwar (1986) find significant negative abnormal returns from SEO announcements, and Mola and Loughran (2004) document that the SEO discount is approximately 3% lower for the closing price on the issue date. One explanation is that firms tend to issue SEOs when liquidity risk decreases to a level where investors have less risk aversion, which implies that low liquidity risk is the main reason for low post-issue stock returns (Lin & Wu, 2013). According to the Q-theory, in the absence of liquidity risk, firms face more market risk before SEOs, after which market risks steadily fall, leading to declining SEO returns (Carlson, Fisher, & Giammarino, 2006). Nevertheless, Myers and Majluf (1984) develop the information asymmetry hypothesis, which states that corporate managers have more information than market investors. Therefore, SEO sends a negative signal that the company uses its superior information to benefit existing shareholders at the expense of new shareholders (Myers & Majluf, 1984).

Consistent with this hypothesis, the pandemic brought enormous uncertainties to Chinese financial markets. Thus, information asymmetry is stronger for areas significantly affected by the pandemic, which induces rational investors to be extremely sensitive to the negative consequences of SEO announcements during the crisis. Since the outbreak of COVID-19 affected China’s local economy and financial markets tremendously, we posit that potential market investors discriminate against SEO announcements issued among regions with varied pandemic effects across China. Thus, our first hypothesis is as follows:

**Hypothesis 1(a).** Market investors respond more negatively to SEO announcements by firms in regions significantly affected by the pandemic than those in the less-affected areas.

The impact of SEO on firm values could be associated with corporate social behaviors, which are generally measured by CSR scores. Prior studies on the impact of CSR performance on SEO announcement effects through agency costs are divided into the following streams. Some studies found that firms’ CSR activities can mitigate agency costs based on Jensen’s (1986) agency costs of free cash flow theory. They believe the interests of managers, shareholders, and other stakeholders are inclined to align within firms that invest more in CSR activities (Freeman, Wicks, & Parmar, 2004; Jawahar & McLaughlin, 2001; Jensen, 2001). Contrary to the view that CSR activities can mitigate agency costs of free cash flow, other studies state that CSR activities are a form of wasteful spending of free cash flow, with the primary goal of enhancing managers’ private benefits at the expense of shareholders (Adhikari, 2016; Barnea & Rubin, 2010; Friedman, 1998; Jo & Harjoto, 2012).

According to the findings from Lins, Servaes, and Tamayo (2017), high-CSR firms experienced higher profitability, growth, and sales per employee relative to low-CSR firms, and they raised more debt during the financial crisis. Some also argue that CSR activities can increase the level of trust between investors and managers and reduce adverse selections (Hosmer, 1995; Kim, Park, & Wier, 2012; Lopatta, Buchholz, & Kaspereit, 2016; Pivato, Misani, & Tencati, 2008). Their findings indicate that a higher level of trust may reduce investors’ perceptions that issuers engage in opportunistic market timing, hence mitigating adverse selection costs associated with equity issuance. Therefore, CSR might alleviate adverse shocks because a higher CSR signals a better corporate governance image to market investors during commonly uncertain times (Borghesi, Chang, & Li, 2019).

The last stream of studies considers CSR performance from the perspective of its impact on the information environment. An important reason for the negative SEO announcement return
is the adverse selection and asymmetric information between issuers and outside investors (Lucas & McDonald, 1990; Myers & Majluf, 1984). CSR activities could reduce adverse selection costs through their association with the level of information asymmetry regarding firms’ assets. However, the relationship between CSR performance and information asymmetry is complex (Dutordoir, Strong, & Sun, 2018). On the one hand, Merton (1987) shows that CSR activities can improve a firm’s information transmission processes; thus, high-CSR firms could lower information asymmetry. Moreover, high-CSR firms might disclose more information relative to other firms, which also attracts greater coverage from analysts and the media (El Ghoul, Guedhami, Kwok, & Mishra, 2011; Hong & Kacperczyk, 2009; Hung, Shi, & Wang, 2015). On the other hand, poor CSR performance might be associated with increased corporate disclosure as firms try to explain their underperformance, resulting in lower information asymmetry for low-CSR firms (Dhaliwal, Li, Tsang, & Yang, 2011). Thus, to solve this empirical puzzle, this study predicts that CSR performance has a positive influence on SEO announcement effects. Hence, we develop the following hypothesis:

**Hypothesis 1(b).** Corporates with better CSR performance experience fewer losses in firm value when announcing SEOs during the COVID-19 outbreak.

The impact of SEO on firm values could be associated with accounting practices. Accounting conservatism, an important aspect of accounting practices, has been widely studied. Watts (2003a, 2003b) defines accounting conservatism as the differential verifiability required for the recognition of economic gains and losses. Kim and Pevzner (2010) reveal that higher current conditional conservatism is associated with a lower probability of future bad news. Conservative accounting helps mitigate the adverse consequences of information asymmetry by providing investors with better tools to monitor managers and limiting managers’ incentives and ability to overstate financial statements (LaFond & Roychowdhury, 2008; LaFond & Watts, 2008; Watts, 2003a). LaFond and Watts (2008) conclude that conservatism reduces information asymmetry between managers and outside investors.

Conservatism accounting can reduce information asymmetry between managers and investors via two potential mechanisms (Lin & Tian, 2012). First, it provides investors with the best non-stock-price “hard” (i.e., verifiable) summary information on firm performance (LaFond & Watts, 2008). Second, hard information delivers a standard that makes it possible for alternative “soft” (i.e., management forecasts and voluntary disclosures) sources to generate credible information. Investors could evaluate the reliability of the information sources by comparing different-source predictions to the hard numbers, thereby lessoning information asymmetry (Lin & Tian, 2012).

According to Kim, Li, Pan, and Zuo (2013), firms with greater information asymmetry face a larger price decline around the announcements. However, accounting conservatism could mitigate this negative relationship between information asymmetry and SEO announcement returns by constraining management’s opportunistic behaviors and mitigating agency problems in firms. Consistent with the prior studies highlighted, we propose the following hypothesis:

**Hypothesis 1(c).** More accounting conservative corporations experience fewer losses in firm values when announcing SEOs during the COVID-19 outbreak.

Prior studies on the determinants of SEO underpricing include capital investments, refinancing, liquidity squeezes, corporate control, stock market microstructure, and timing by
managers with private information that their stock is overvalued (Baker & Wurgler, 2002; Graham & Harvey, 2001; Loughran & Ritter, 1997). He, Wang, and Wei (2014) also finds that the stock liquidity of SEO firms will be lower after issuing SEOs, and smaller SEO underpricing is positively associated with a greater reduction in the transaction cost measures of illiquidity. Further, Duca (2016) finds that post-issue stock returns are negatively associated with underpricing in a follow-on offering, implying that investors are influenced by market feedback on the investment opportunities in subsequent SEOs.

Most recently, Kwon, Park, and Yu (2018) examines the impact of the global financial crisis (GFC) on SEO underpricing. Their findings indicate that auditors’ industry expertise had a negative and significant association with SEO underpricing before the GFC. However, they failed to find this significance after the GFC. According to them, the GFC impacted investor confidence in auditors’ industry expertise and increases information asymmetry that enlarges IPO underpricing. Consistent with Kwon et al. (2018), we posit that the COVID-19 outbreak, which is like the GFC, leads to a stronger information asymmetry and positively impacts SEO underpricing significantly. Therefore, we develop another hypothesis as follows:

**Hypothesis 2(a).** Firms in the regions significantly affected by the pandemic experience more SEO underpricing levels than those in the less-affected areas.

According to Jung et al. (1996), negative investor reactions to SEO announcements could be related to the strength of issuers’ corporate governance, since investors are more concerned about the possible misuse of SEO proceedings. This result is verified by Kim and Purnanandam (2014). Their findings indicate that weak corporate governance results in negative investor reactions to SEO announcements. Later, Walker, Yost, and Zhao (2016) employ a sample of companies that conduct multiple SEOs and document that repeat SEO firms can build credibility via successful prior SEOs and SEO announcements, thus inducing less negative market reactions.

Based on ethical theory, initially proposed by Carroll (1979), firms or managers have an incentive to be honest and ethical and adhere to a high standard of behavior because such behavior is beneficial to the firm (Jones, 1995; Kim et al., 2012). Gelb and Strawser (2001) also reached a similar conclusion. They find a positive relationship between disclosure levels and CSR, indicating that ethical firms have incentives to provide extensive and informative disclosures. If managers are engaged in CSR activities, we assume they are more likely to enhance the transparency of financial reports to reduce the information asymmetry between firm insiders and outside equity investors. Since SEO underpricing is related to information asymmetry, we predict a negative relationship between the issuer’s CSR practices and SEO underpricing. Thus, the next hypothesis is as follows:

**Hypothesis 2(b).** CSR performance of the firm decreases SEO underpricing levels when announcing SEOs during the COVID-19 outbreak.

Empirical evidence indicates that stock prices decline with the announcement of SEOs due to negative information about the issuing firm’s prospects (Myers & Majluf, 1984). The pecking order theory by Myers and Majluf (1984) states that, given asymmetric information between outside investors and the firm, the order of the firm’s financing choice should be internal funds, risk-free debt, risky debt, and equity. Since equity financing suffers the most severe information asymmetry problem between outside investors and firm insiders, outside potential investors
tend to undervalue the firm’s equity. Therefore, the firm is willing to issue new equity only when the stock market overvalues it.

In Italy, Pagano, Panetta, and Zingales (1998) find that IPOs are mainly motivated by the overvaluation and timing of the market. Kim and Weisbach (2008) provide worldwide evidence that firms with high market-to-book ratios are more likely to keep more cash from a marginal dollar raised from SEOs than low market valuation firms, suggesting that firms with high market valuation are more likely to conduct SEOs to take advantage of their overvaluation. Henderson, Jegadeesh, and Weisbach (2006) document that market timing considerations appear to be very important in equity issuance decisions not only for domestic (US) firms but also for firms conducting cross-border equity financing.

Accounting conservatism reduces IPO underpricing by mitigating the impact of information asymmetry in the Chinese market (Lin & Tian, 2012) and across the nation (Boulton et al., 2017). Moreover, IPO underpricing is strongest for small firms in which information asymmetries are likely to be high. Since SEO underpricing has a mechanism similar to IPO underpricing, we develop our last hypothesis as follows:

**Hypothesis 2(c).** Accounting conservatism of the firm mitigates its SEO underpricing levels when announcing SEOs during the COVID-19 outbreak.

### 3 | DATA AND METHODOLOGY

#### 3.1 | Data and SEO sample

Our sample data were collected from the following two sources. First, we retrieved the pandemic data from the China Stock Market and Accounting Research (CSMAR) database to serve as a proxy of relative regional pandemic severity. We scale the number of provincial COVID-19 mortalities by the total number of casualties in China by May 31, 2020. The pandemic death proportion of an average province is approximately 2.15%. The stock returns and firm characteristics are from the CSMAR database. Second, our CSR scores were collected from the Chinese Research Data Services Platform (CNRDS).

We include all A-share firms (except financial ones) listed on the Shanghai and Shenzhen Stock Exchange that announced their SEO from January 1, 2019, to May 31, 2020. Our final sample consists of 199 SOE firms, an average CSR score of 6.59. Table 1 lists more details of the summary statistics of the key variables, and Table A1 shows the definitions of these variables.

#### 3.2 | Empirical model

Prior literatures have recognized the information signaling of the SEO announcement effects of the firm information environment and corporate governance practices (e.g., Booth & Chang, 2011; Boulton et al., 2017; Feng et al., 2018). Meanwhile, SEO underpricing has been widely considered as the signal of the firm quality (Altinkılıç & Hansen, 2003), risks (Lowry & Shu, 2002), and the cost of raising equity capital (Bowen et al., 2008). A few other studies have also concluded that information asymmetry adversely affects market investor responses and the cost of raising equity capital during SEO (Altinkılıç & Hansen, 2003; Kim et al., 2013). Hence, both SEO announcement effects and underpricing could signal the information of the firm.
## Table 1: Summary statistics

| Variables                      | Obs  | Mean  | Std. Dev. | Min  | Max  |
|--------------------------------|------|-------|-----------|------|------|
| **Panel A: Main result statistics** |      |       |           |      |      |
| CAR[−1,1]                      | 199  | −0.084| 0.039     | −0.188 | 0.151 |
| CAR[−7,7]                      | 199  | −0.026| 0.066     | −0.185 | 0.285 |
| Underpricing                   | 199  | 0.205 | 0.255     | −0.264 | 0.963 |
| Mortality                      | 199  | 0.106 | 0.100     | 0     | 0.474 |
| M_B                            | 199  | 1.31  | 1.925     | 0.034 | 22.894 |
| CSR                            | 199  | 2.915 | 3.646     | 0     | 10   |
| C_score                        | 199  | 0.134 | 1.829     | −0.098 | 25.731 |
| BS_score                       | 199  | 0.282 | 9.491     | −33.401 | 78.347 |
| Spread                         | 199  | 0.007 | 0.003     | 0.001 | 0.014 |
| Leverage                       | 199  | 0.500 | 0.189     | 0.0435 | 0.940 |
| Board size                     | 199  | 8.769 | 1.953     | 5     | 17   |
| CEO duality                    | 199  | 0.221 | 0.416     | 0     | 1    |
| ln_marketcap                   | 199  | 22.624| 1.243     | 21.037 | 27.986 |
| Institution_own                | 199  | 0.486 | 0.239     | 0.001 | 0.970 |
| ln_GDP                         | 199  | 0.011 | 0.000     | 0.010 | 0.012 |
| Tobin’s Q                      | 199  | 1.776 | 1.831     | 0.799 | 23.619 |
| ROE                            | 199  | 0.073 | 0.138     | −0.9831 |       |
| SEO                            | 199  | 0.186 | 0.412     | 0     |       |
| Relative_Offer_Size            | 199  | 0.425 | 0.223     | 0     |       |
| ln_donation                    | 199  | 5.735 | 2.167     | −1.6346 | 10.319 |
| CARP                           | 199  | 0.493 | 0.501     | 0     | 1.000 |
| CARN                           | 199  | 0.507 | 0.501     | 0     | 1.000 |
| Volatility1                    | 199  | 0.028 | 0.010     | 0.006 | 0.057 |
| Volatility2                    | 199  | 0.027 | 0.012     | 0.006 | 0.067 |
| Spread                         | 199  | 0.007 | 0.003     | 0.001 | 0.022 |
| Stock_return                   | 199  | 0.003 | 0.031     | −0.100 | 0.100 |
| Trading_volume                 | 199  | 23.467| 1.198     | 21.319 | 26.954 |
| **Panel B: Discussion statistics** |      |       |           |      |      |
| SEO                            | 5,300| 0.077 | 0.266     | 0.000 | 1.000 |
| Overvaluation                  | 5,300| −0.024| 1.475     | −11.067 | 22.392 |
| Investment                     | 5,300| 0.087 | 0.089     | −0.293 | 0.227 |
| Tradeoff                       | 5,300| −0.007| 0.192     | −0.733 | 0.621 |
| Sales_growth                   | 5,300| 0.009 | 2.002     | −9.137 | 7.542 |
| Volatility3                    | 5,300| 0.021 | 0.013     | 0.001 | 0.065 |
| Firm_size                      | 5,300| 22.573| 1.557     | 18.107 | 30.952 |
| ROE                            | 5,300| −0.081| 3.393     | −163.817 | 0.926 |
| EAE                            | 5,300| −0.003| 0.056     | −0.174 | 0.098 |
performance to the market. Unlike underpricing, CAR considers the previous market performance of the firm in the estimation window. It could be extended to a longer event window, as we did (event window \([-7, 7]\)) in our robustness tests. The SEO announcement effect simply investors responded to the firm financial performance and information released (Booth & Chang, 2011; Elliott, Prevost, & Rao, 2009), however SEO underpricing directly measures the cost of raising equity capital. Because SEO underpricing occurs when the price of the offer is lower than the closing price on the day prior to the offer date, it represents a substantial cost to firms when raising capital (Altinkılıç & Hansen, 2003). We thus include both SEO announcement effects and underpricing to test whether the COVID-19 pandemic has an impact on firm SEO announcement returns and how this impact influences the cost of equity capital raising during the SEO.

To assess the impact of COVID-19 on SEO CARs and underpricing, we take the following difference-in-differences (DID) approach:

\[
\text{CAR}_{it} = \beta_0 + \beta_1 \text{Mortality}_i + \beta_2 \text{Post}_i + \beta_3 \text{Post}_i \times \text{Mortality}_i + \phi_{it} + \mu_i + \eta_t + \varepsilon_{it},
\]

\[
\text{Underpricing}_{it} = \beta_0 + \beta_1 \text{Mortality}_i + \beta_2 \text{Post}_i + \beta_3 \text{Post}_i \times \text{Mortality}_i + \phi_{it} + \mu_i + \eta_t + \varepsilon_{it},
\]

where \(\text{CAR}_i\) indicates the CAR for firm \(i\) around the SEO announcement over the event window \((-1, 1)\). Based on the efficient market hypothesis, we employ the event study methodology to assess the impact of SEO announcements on firm value, which follows Wang and Chou (2018), Kim et al. (2013), and Elliott et al. (2009). Specifically, we adopt the single-factor market model to compute the CARs and set the estimation window of stock beta to \([-180, -30]\) days. Moreover, we use the SEO announcement date as the event date and compute the CAR over the \([-1, 1]\) event window. \(\text{Underpricing}_i\) indicates the underpricing levels of firm \(i\), which is computed by the underpricing level of the first day’s open and close price (e.g., Bo et al., 2011). \(\text{Mortality}_i\) indicates the number of the provincial COVID-19 mortality scaled by the total number of casualties in China. \(\text{Post}_i\) is a dummy variable equal to one if the share pledging announcement is after January 23, 2020, and zero otherwise. This situation is because COVID-19 was first found in Wuhan city of Hubei province in November 2019 and spread rapidly throughout the nation in the following months. A city lockdown policy came into effect in Wuhan on January 23, 2020, which set a precedent for similar measures in many Chinese cities. Our control variables \(\phi_{it}\) include a set of firms and other characteristics in the year prior to the SEO announcement that are generally associated with SEO announcement returns. Following Kim et al. (2013), we include the leverage ratio, market-to-book ratio, the natural logarithm of market capitalization, relative offer size (i.e., the number of shares offered divided by the total shares outstanding prior to the SEO announcement), and SEO shares (i.e., the proportion of SEO shares sold by existing shareholders to the total SEO shares offered). To consider the variation of the province characteristics that will influence mortality during the pandemic, we control for the natural logarithm of the provincial GDP. We also control for firm corporate governance characteristics, including institutional shareholding percentages, CEO duality dummy, and size of the board and profitability characteristics (ROE). For SEO underpricing, we follow Corwin (2003) and consider the CAR positive (CARP) and negative effects (CARN) and stock volatility (Volatility1). Stock volatility is defined as standard deviation of daily close-to-close returns over the 30 trading days ending 11 days prior to SEO. Furthermore, for all the estimations, we include the industry fixed effect (\(\mu_i\)) and Month*Year (\(\eta_t\)) and cluster the standard error at the industry level.
We then investigate the moderation effect by firm characteristics such as accounting conservatism and CSR scores, as shown in the model below:

\[
CAR_i = \beta_0 + \beta_1 \text{Mortality}_i + \beta_2 \text{Post}_i + \beta_3 \text{Firm characteristics}_i + \phi \_it + \mu + \eta + \epsilon_{it},
\]

(3)

\[
\text{Underpricing}_{it} = \beta_0 + \beta_1 \text{Mortality}_i + \beta_2 \text{Post}_i + \beta_3 \text{Firm characteristics}_i + \phi \_it + \mu + \eta + \epsilon_{it},
\]

(4)

where Firm characteristics denotes firm i’s characteristics, such as CSR scores or accounting conservatism, and the coefficient \( \beta_4 \) shows the moderation effect of our interest.

Existing studies apply different proxies for accounting conservatism. Following studies such as those by Beatty and Liao (2011), Beatty et al. (2012), Tan (2012), and Kim et al. (2013), we select the C Score, developed by Khan and Watts (2009), as our key measurement of conservatism. The C Score is created via Basu’s (1997) asymmetric timeliness measures and further advanced by Khan and Watts (2009). Using the model from Khan and Watts (2009), we estimate the C Score for each firm-year using a cross-sectional approach based on size, leverage, and market-to-book ratio through the following models. The financial information in the years prior to the SEO announcement is applied to estimate the C Score.

\[
EAR_i = \beta_0 + \beta_1 \text{DR}_t + \beta_2 \text{RET}_t + \beta_3 \text{DR}_t \times \text{RET}_t + \epsilon_{it},
\]

(5)

\[
G \text{ Score}_i = \mu_0 + \mu_1 \text{MV}_t + \mu_2 \text{MB}_t + \mu_3 \text{LEV}_t + \epsilon_{it},
\]

(6)

\[
C \text{ Score}_i = \lambda_0 + \lambda_1 \text{MV}_t + \lambda_2 \text{MB}_t + \lambda_3 \text{LEV}_t + \epsilon_{it},
\]

(7)

\[
EAR_i = \beta_0 + \beta_1 \text{DR}_t + (\mu_0 + \mu_1 \text{MV}_t + \mu_2 \text{MB}_t + \mu_3 \text{LEV}_t + \epsilon_{it}) \times \text{RET}_t + (\lambda_0 + \lambda_1 \text{MV}_t + \lambda_2 \text{MB}_t + \lambda_3 \text{LEV}_t + \epsilon_{it}) \times \text{DR}_t \times \text{RET}_t + (\rho_1 \text{MV}_t + \rho_2 \text{MB}_t + \rho_3 \text{LEV}_t + \rho_4 \text{MV}_t \times \text{MB}_t + \rho_5 \text{LEV}_t \times \text{MV}_t + \rho_6 \text{MB}_t \times \text{LEV}_t) + \epsilon_{it},
\]

(8)

where \( EAR_i \) indicates the net income scaled by the beginning market value of firm i. \( \text{RET}_t \) indicates the stock returns of firm i. \( \text{DR}_t \) is a dummy variable; it is one if \( \text{RET} \) is negative and zero otherwise. \( \text{MV}_t \) indicates the natural logarithm of the market value of firm i. \( \text{MB} \) indicates the market-to-book ratio of firm i. \( \text{LEV} \) indicates the debt-to-asset ratio of firm i. \( G \text{ Score}_i \) scores represent good news. \( C \text{ Score}_i \) scores represent bad news. \( \epsilon_{it} \) indicates the residuals of the model.

### 4 MAIN RESULTS

We report our main regression results as a market reaction of SEO announcements during the pandemic period in Table 2. Column (1) of Table 2 shows that the SEO announcement CARs from firms located in more severely affected provinces experienced a statistically significant decline by 9.2%. This finding is consistent with Hypothesis 1(a). This finding accords with Ding et al. (2020). Columns (2) and (3) of Table 2 show the empirical results of moderation factors: corporate social responsibilities and accounting conservatism. Column (2) suggests that SEO
firms with a higher CSR score last year would experience 15.3% fewer losses in firm values, confirming Hypothesis 1(b). This finding is similar to the SEO practices in the Korean market (Choi, Kwak, & Choe, 2010). It also accords with Lins et al. (2017) who found that firms with better CSR perform better during financial recessions. Column (3) shows that the negative market reactions of SEO announcements were mitigated by 1.6% by accounting conservatism, relative to their counterparts in areas significantly affected by the pandemic. This finding confirms Hypothesis 1(c). This result is also supported by Kim et al. (2013), where issuers with a greater degree of conservatism face fewer negative market reactions to SEO announcements.

Table 3 exhibits the main estimations regarding SEO underpricing levels during the pandemic. Column (1) of Table 3 shows that SEO firms with significantly affected provinces have 34.2% more underpriced stocks than their counterparts, as predicted in Hypothesis 2(a) and supported by Kwon et al. (2018). Columns (2) and (3) of Table 3 still show us the moderation factors of SEO underpricing through corporate social responsibilities and accounting conservatism. Column (2) suggests that SEO firms with better CSR performance last year would experience much less underpricing levels, by 16.4%, even in areas with high effects of the pandemic, echoing Feng et al. (2018). Column (3) indicates that SEO underpricing levels could be reduced by 15.5% since SEO firms practice conservative accounting. This finding accords with Hypothesis 2(c) and Lin and Tian (2012) and Boulton et al. (2017). Meanwhile, all the three specifications reveal that SEO underpricing will be strengthened by high stock volatility and large positive accumulative abnormal returns, while negative accumulative abnormal returns do not affect SEO underpricing. These findings are consistent with Bo et al. (2011).

Our findings are consistent with our expectations that market investors would respond more negatively to SEOs announced by firms from regions significantly affected by the pandemic than those from the less-affected regions. Meanwhile, SEOs announced by firms located in significantly affected provinces experience more underpricing (higher costs of raising equity) compared to their counterparts. Additionally, SEOs announced by firms with higher CSR scores and more accounting conservatism practices exhibit less losses in firm values during the pandemic period. SEOs announced by firms with a CSR-investment focus and accounting conservatism engagement show less underpricing (lower costs).

Empirical evidence indicates that stock prices decline due to SEO announcements (Denis, 1994; Hauser, Kraizberg, & Dahan, 2003; Jung et al., 1996; Masulis & Korwar, 1986; Veld, Verwijmeren, & Zabolotnyuk, 2017). The negative announcement return is mostly attributed to the adverse selection that results from asymmetric information between issuers and outside investors (Lucas & McDonald, 1990; Myers & Majluf, 1984). Firms with higher information asymmetries experience larger price drops on the SEO announcement date (Booth & Chang, 2011; Dierkens, 1991). Several existing studies also confirm this mechanism. D’Mello and Ferris (2000) find that the negative SEO announcement effects are more severe for firms with fewer analysts following and higher information asymmetry. Kim et al. (2013) reveal that firms with a greater degree of conservatism have lower negative SEO announcement returns; this effect is mitigated by the information asymmetry level.

Following previous studies, we use a measure of information asymmetry as a significant mechanism of SEO negative market reaction. From the existing literature (e.g., Holden & Jacobsen, 2014; Kim et al., 2013; Nagar, Schoenfeld, & Wellman, 2019), we use daily bid-ask spread as a proxy for market information asymmetries based on the market model over 60 trading days prior to the SEO announcement. We use the bid-ask spread estimator derived from the daily high and low prices following Corwin and Schultz (2012). We first estimate the daily information asymmetry level of the SEO firms during the pandemic. As shown in Column (1) of
| Variables                              | (1) \( \text{CAR}[−1,1] \) | (2) \( \text{CAR}[−1,1] \) | (3) \( \text{CAR}[−1,1] \) |
|----------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Post × mortality                       | −0.092** (0.005)            | 0.105 (0.080)               | −0.033 (0.013)               |
| Post × mortality × CSR                 |                             | 0.153** (0.053)             |                             |
| Post × mortality × C_score             |                             |                             | 0.016** (0.001)             |
| Mortality × CSR                        |                             | −0.015*** (0.003)           |                             |
| Post × CSR                             |                             | 0.003 (0.005)               |                             |
| Mortality × C_score                    |                             |                             | −0.001 (0.001)              |
| Post × C_score                         |                             |                             | 0.001 (0.000)               |
| CSR                                    |                             | 0.003*** (0.001)            |                             |
| C_score                                |                             |                             | 0.002 (0.003)               |
| Mortality                              | −0.008 (0.004)              | −0.038 (0.048)              | −0.013 (0.005)              |
| M_B                                    | 0.007 (0.015)               | 0.004 (0.004)               | 0.007 (0.015)               |
| Leverage                               | 0.027 (0.007)               | 0.019 (0.012)               | 0.021 (0.004)               |
| Board size                             | −0.003*** (0.000)           | −0.004*** (0.001)           | −0.003*** (0.000)           |
| CEO duality                            | −0.002 (0.005)              | 0.000 (0.003)               | 0.000 (0.004)               |
| ln_marketcap                           | 0.002*** (0.000)            | 0.002*** (0.000)            | 0.003*** (0.000)            |
| Institution_own                        | 0.031 (0.019)               | 0.039*** (0.007)            | 0.021 (0.017)               |
| Tobin’s Q                              | −0.007 (0.013)              | −0.005 (0.004)              | −0.007 (0.013)              |
| ROE                                    | −0.028 (0.036)              | −0.020 (0.011)              | −0.029 (0.019)              |
| SEO shares                             | −0.002 (0.005)              | −0.003 (0.004)              | 0.002 (0.002)               |
Table 4, SEO firms located at significantly affected provinces have 18.1% higher information asymmetry than their counterparts, as supported by the recent findings from Rainero, Coda, and Migliavacca (2020). Columns (2) and (3) of Table 4 further show us the moderation factors of information asymmetry through corporate social responsibilities and accounting conservatism. Column (2) suggests that SEO firms with better CSR performance would have less information asymmetry, by 1.9%. Column (3) indicates that information asymmetry levels could be reduced by 2.4% if SEO firms engaged in conservative accounting practice.3

Because firms from regions significantly affected by the pandemic experience a higher level of information asymmetry, the information asymmetry level of SEO firms could significantly influence SEO announcement returns (Booth & Chang, 2011) and underpricing (Corwin, 2003). Therefore, we consider information asymmetry level as the channel of the impact from the pandemic on the SEO announcement returns and underpricing and thus conduct the following four-way DID estimation.

Not surprisingly, our finding from Column (1) of Table 5 shows that firms with greater information asymmetry experience more negative market reactions toward SEO announcements during the pandemic. It echoes findings by Liao, Kang, Morris, and Tang (2013) and Fosu, Danso, Ahmad, and Coffie (2016) that the adverse effect of information asymmetry and firm value is strengthened during the crisis or under more market uncertainties. Column (2) of Table 5 further reveals that the negative association between higher CSR investments and SEO negative market reaction could be weakened by the information asymmetry level, which is consistent with the findings of Cho, Lee, and R. J. (2013) and Cui, Jo, and Na (2018).

As presented in Column (3), accounting conservatism also relieves the negative impact of information asymmetry. This finding echoes Kim et al. (2013) that accounting conservatism lessens adverse selection problems and further decreases the agency costs caused by information asymmetry between insiders and outside equity investors in the SEO market.

Consistent with Li and Zhuang (2012), Bowen et al. (2008), and He et al. (2014), we also explore the economic mechanism of IPO underpricing via information asymmetry. Table 6 shows the channels of information asymmetry to SEO underpricing levels. As supported by Liao et al. (2013) and Fosu et al. (2016), Column (1) states that firms with higher information asymmetry...
### Table 3: The impact of SEO underpricing during the pandemic

| Variables                  | (1) Underpricing | (2) Underpricing | (3) Underpricing |
|----------------------------|------------------|------------------|------------------|
| Post × mortality           | 0.342***         | 0.301            | 0.203            |
|                            | (0.094)          | (0.500)          | (0.212)          |
| Post × mortality × CSR     | −0.164***        |                  | −0.155**         |
|                            | (0.001)          |                  | (0.008)          |
| Post × mortality × C_score |                  |                  | −0.112***        |
|                            |                  |                  | (0.000)          |
| Mortality × CSR            | −0.001           |                  | 0.020            |
|                            | (0.000)          |                  | (0.019)          |
| Post × CSR                 | −0.024           |                  |                  |
|                            | (0.027)          |                  |                  |
| Mortality × C_score        |                  | −0.011**         | −0.040***        |
|                            |                  | (0.005)          | (0.009)          |
| CSR                        |                  | −0.011**         |                  |
|                            |                  | (0.005)          |                  |
| C_score                    |                  | −0.011**         | −0.040***        |
|                            |                  | (0.005)          | (0.009)          |
| Mortality                  | 0.115            | 0.401            | 0.372*           |
|                            | (0.138)          | (0.066)          | (0.042)          |
| M_B                        | 0.016            | 0.016            | −0.002           |
|                            | (0.051)          | (0.043)          | (0.035)          |
| Leverage                   | 0.147***         | 0.141**          | 0.143*           |
|                            | (0.043)          | (0.056)          | (0.073)          |
| Board size                 | 0.018***         | 0.016***         | 0.008**          |
|                            | (0.004)          | (0.001)          | (0.003)          |
| CEO duality                | 0.039**          | 0.046***         | 0.020*           |
|                            | (0.013)          | (0.014)          | (0.009)          |
| ln_marketcap               | −0.066           | −0.067           | −0.011           |
|                            | (0.097)          | (0.101)          | (0.096)          |
| Institution_own            | 0.013            | 0.028            | 0.017            |
|                            | (0.051)          | (0.037)          | (0.069)          |
| Tobin’s Q                  | −0.029           | −0.026           | −0.010           |
|                            | (0.040)          | (0.033)          | (0.028)          |
| ROE                        | −0.104           | −0.085           | −0.244           |
|                            | (0.198)          | (0.207)          | (0.207)          |
| SEO shares                 | 0.055            | 0.057            | 0.001            |
|                            | (0.096)          | (0.094)          | (0.084)          |
asymmetry have more SEO underpricing levels. This effect could be mitigated by higher CSR performance accounting and accounting conservatism, as shown in Columns (2) and (3), respectively. This finding echoes the related literature that connects SEO or IPO underpricing with accounting conservatism (Boulton et al., 2017; Lin & Tian, 2012) and CSR performance (Feng et al., 2018) since better CSR performance and accounting conservatism provides extensive and informative disclosures, which mitigate the degree of information asymmetry.

5 | ROBUSTNESS TESTS

In this section, we perform additional tests to demonstrate the robustness of our results. First, the possible observed and unobserved province invariant factors that are correlated with firm value can cause an estimation bias in our main results. Thus, we explicitly include the province fixed effect in all the major analyses. Tables 7 and 8 display the results for our main estimations and their economic mechanisms for SEO market reaction and SEO underpricing, respectively, and both statistical significances still hold.

Second, to show the robustness of our choice of the event window, we use a longer event window \([-7, 7]\) and find our main research results related to SEO market performance remain virtually unchanged in terms of statistical significance and economic magnitude, as presented in Columns (1) to (6) of Table 9.

Third, we also use firms’ philanthropic donation during the pandemic (collected from the China Association for Public Companies) as an alternative proxy of social responsibility.
Columns (1) and (3) of Table 10 show that the firms with higher donations during the pandemic had a less negative market reaction to their SEO announcements and SEO underpricing, respectively. This finding also corresponds to Surroca et al. (2010) who found that firms’
| Variables | (1) CAR[-1,1] | (2) CAR[-1,1] | (3) CAR[-1,1] |
|-----------|---------------|---------------|---------------|
| Post × mortality × spread | −0.163*** (0.002) | −0.604* (0.326) | −0.275 (0.156) |
| Post × mortality × CSR × spread | 0.809* (0.411) |               |               |
| Post × mortality × C_score × spread |               | 0.238** (0.055) |               |
| Post × mortality | 0.001 (0.001) | 0.006* (0.003) | 0.002 (0.001) |
| Post × spread | 3.807 (1.804) | 7.003 (5.338) | 4.693 (2.252) |
| Mortality × spread | 0.011 (0.077) | 0.299** (0.125) | 0.022 (0.110) |
| Mortality × CSR |               | 0.001* (0.000) |               |
| Post × CSR |               | 0.010 (0.014) |               |
| CSR × spread |               | 0.845** (0.384) |               |
| Post × mortality × CSR | 0.001 (0.001) |               |               |
| Mortality × CSR × spread | −0.062*** (0.014) |               |               |
| Post × CSR × spread | −0.898 (1.286) |               |               |
| Mortality × C_score |               | 0.001 (0.001) |               |
| Post × C_score |               | 0.014** (0.002) |               |
| C_score × spread |               | −0.102 (0.236) |               |
| Post × mortality × C_score | 0.002* (0.001) |               |               |
| Mortality × C_score × spread | −0.001 (0.036) |               |               |
| Post × C_score × spread |               | −1.222** (0.284) |               |

(Continues)
philanthropic donations could promote firm value by promoting CSR performance. Columns (2) and (4) of Table 10 show that the mechanism still falls on information asymmetry since higher-profiled firms with higher donations draw more attention from the market with more information release. The findings are similar to the effects of CSR.

Fourth, we apply an alternative accounting conservatism proxy proposed by Ball and Shivakumar (2006), which several recent studies, including those by Mali and Lim (2018), Hong (2016), and Hong (2020) also use. We adopt this measure because some recent studies challenge the usefulness of C_Score in measuring errors and potential biases (Givoly, Hayn, & Natarajan, 2007) and the potential confounding effects of operating cash flow asymmetric timeliness (Collins, Hribar, & Tian, 2012). The estimation model from Ball and Shivakumar (2006) is as follows:

\[ TA_i = \beta_0 + \beta_1 \text{CFO}_t + \beta_2 \text{DCFO}_t + \beta_3 \text{CFO}_t \times \text{DCFO}_t + \beta_4 \text{GW}_t + \beta_5 \text{PPE}_t + \epsilon_{it}, \]  

(9)

where \( TA_i \) indicates total accruals scaled by the initial total assets of firm \( i \). CFO\(_t\) indicates cash flows from operations scaled by the initial total assets of firm \( i \). DCFO\(_t\) is a dummy variable that indicates one if CFO is negative and zero otherwise. GW\(_t\) indicates sales growth rate of firm \( i \). PPE\(_t\) indicates property, plant, and equipment scaled by the initial total assets of firm \( i \). \( \epsilon_{it} \) indicates the residuals of the model. Based on the accounting conservatism measure from the Ball and Shivakumar (2006) model, our main estimation remains, as shown in Table 11.

Finally, we intend to investigate how the pandemic influences SEO announcements and how CSR and accounting conservatism moderate this effect. Given a lower negative return and SEO underpricing, the SEO announcement could be encouraged since shareholders will not suffer from higher capital-raising costs. We conduct three logit models for a further DID estimation based on the same sample period as our main results. Following the spirit of Bo et al. (2011), in our logit models, we set our dependent variable SEO as a dummy variable which is equal to one if a firm conducts SEO during the sample period and zero otherwise. We control for the lagged firm characteristics, including the number of years between the current SEOs

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### Table 5 (Continued)

| Variables   | (1) CAR[−1,1] | (2) CAR[−1,1] | (3) CAR[−1,1] |
|-------------|---------------|---------------|---------------|
| Firm control | Yes           | Yes           | Yes           |
| Province control | Yes          | Yes           | Yes           |
| Time FE      | Yes           | Yes           | Yes           |
| Industry FE  | Yes           | Yes           | Yes           |
| Observations | 199           | 199           | 199           |
| R-squared    | 0.119         | 0.546         | 0.138         |

Note: Firm controls include leverage ratio, market-to-book ratio, the natural logarithm of market capitalization, institutional shareholding percentages, relative offer size, SEO shares, CEO duality, size of the board, ROE, and Tobin’s Q. Province controls include the lagged provincial GDP. Industry and time fixed effects are included in all estimations. Standard errors, clustered at the industry level, are shown in brackets. The detailed definitions of variables are in Table A1 of the Appendix. *, **, and *** denote significance at the 10, 5, and 1% level, respectively.
TABLE 6  The channel of the impact of SEO announcement on SEO underpricing during the pandemic

| Variables                  | (1) Underpricing    | (2) Underpricing    | (3) Underpricing    |
|----------------------------|---------------------|---------------------|---------------------|
| Post × mortality × spread | 0.210**             | 0.430*              | 0.142               |
|                            | (0.011)             | (0.036)             | (0.115)             |
| Post × mortality × CSR × spread | −0.076**         |                      | −0.335**            |
|                            | (0.002)             |                      | (0.148)             |
| Post × mortality × C_score × spread | 0.711*           |                      |                     |
|                            | (0.089)             |                      |                     |
| Mortality × CSR            | −0.355**            |                      |                     |
|                            | (0.023)             |                      |                     |
| Post × CSR                 | 6.324               | 0.053**             |                     |
|                            | (1.295)             | (0.002)             |                     |
| Mortality × CSR × spread   | −0.053**            |                      |                     |
|                            | (0.002)             |                      |                     |
| Post × CSR × spread        | −0.870              |                      |                     |
|                            | (0.139)             |                      |                     |
| Post × mortality × CSR     | 0.705               |                      |                     |
|                            | (0.940)             |                      |                     |
| Post × C_score             | 0.447**             |                      |                     |
|                            | (0.171)             |                      |                     |
| C_score × spread           | 4.316**             |                      |                     |
|                            | (1.658)             |                      |                     |
| Mortality × C_score        | 1.106               |                      |                     |
|                            | (0.934)             |                      |                     |
| Post × mortality × C_score | −2.915**            |                      |                     |
|                            | (1.327)             |                      |                     |
| Mortality × C_score × spread | −0.150             |                      |                     |
|                            | (0.108)             |                      |                     |
| Post × C_score × spread    | −5.966***           |                      |                     |
|                            | (2.019)             |                      |                     |

(Continues)
### Table 6 (Continued)

| Variables | (1) Underpricing | (2) Underpricing | (3) Underpricing |
|-----------|------------------|------------------|------------------|
| Firm control | Yes | Yes | Yes |
| Province control | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes |
| Observations | 199 | 199 | 199 |
| $R^2$ | 0.254 | 0.287 | 0.628 |

Note: Industry and time fixed effects are included in all estimations. Standard errors, clustered at the industry level, are shown in brackets. The detailed definitions of variables are in Table A1 of the Appendix. *, **, and *** denote significance at the 10, 5, and 1% level, respectively.

### Table 7 The impact of SEO announcement on firms’ market value during the pandemic based on province fixed effect

| Variables | (1) CAR $[-1,1]$ | (2) CAR $[-1,1]$ | (3) CAR $[-1,1]$ | (4) CAR $[-1,1]$ | (5) CAR $[-1,1]$ | (6) CAR $[-1,1]$ |
|-----------|------------------|------------------|------------------|------------------|------------------|------------------|
| Post × mortality | $-0.132^{**}$ | (0.005) |
| Post × mortality × CSR | $0.136^{***}$ | (0.035) |
| Post × mortality × C_score | $0.205^{**}$ | (0.004) |
| Post × mortality × spread | $-0.043^{*}$ | (0.006) |
| Post × mortality × CSR × spread | $2.611^{**}$ | (1.016) |
| Post × mortality × C_score × spread | $0.451^{**}$ | (0.083) |
| Firm control | Yes | Yes | Yes | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Province FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 197 | 197 | 197 | 197 | 197 | 197 |
| $R^2$ | 0.326 | 0.699 | 0.351 | 0.338 | 0.741 | 0.369 |

Note: Firm controls include leverage ratio, market-to-book ratio, the natural logarithm of market capitalization, institutional shareholding percentages, relative offer size, SEO shares, CEO duality, size of the board, ROE, and Tobin’s Q. Province controls include the lagged provincial GDP. Industry and time fixed effects are included in all estimations. Standard errors, clustered at the industry level, are shown in brackets. The detailed definitions of variables are in Table A1 of the Appendix. *, **, and *** denote significance at the 10, 5, and 1% level, respectively.
TABLE 8  The impact of SEO announcement on SEO underpricing during the pandemic based on province fixed effect

| Variables                      | (1) Underpricing | (2) Underpricing | (3) Underpricing | (4) Underpricing | (5) Underpricing | (6) Underpricing |
|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Post × mortality              | 0.561***         |                  |                  |                  |                  |                  |
|                               | (0.153)          |                  |                  |                  |                  |                  |
| Post × mortality × CSR        | −0.124**         |                  |                  |                  |                  |                  |
|                               | (0.005)          |                  |                  |                  |                  |                  |
| Post × mortality × C_score    | −0.153**         |                  |                  |                  |                  |                  |
|                               | (0.001)          |                  |                  |                  |                  |                  |
| Post × mortality × spread     |                  |                  |                  | 0.203***         |                  |                  |
|                               |                  |                  |                  | (0.034)          |                  |                  |
| Post × mortality × CSR × spread |                  |                  |                  | −0.188*         |                  |                  |
|                               |                  |                  |                  | (0.030)          |                  |                  |
| Post × mortality × C_score × spread |                  |                  |                  | −0.189**        |                  |                  |
|                               |                  |                  |                  | (0.064)          |                  |                  |
| Firm control                  | Yes              | Yes              | Yes              | Yes              | Yes              | Yes              |
| Time FE                       | Yes              | Yes              | Yes              | Yes              | Yes              | Yes              |
| Industry FE                   | Yes              | Yes              | Yes              | Yes              | Yes              | Yes              |
| Province FE                   | Yes              | Yes              | Yes              | Yes              | Yes              | Yes              |
| Observations                  | 194              | 195              | 196              | 197              | 198              | 199              |
| R-squared                     | 0.491            | 0.553            | 0.620            | 0.536            | 0.651            | 0.703            |

Note: Firm controls include leverage ratio, market-to-book ratio, the natural logarithm of market capitalization, institutional shareholding percentages, Relative Offer Size, SEO shares, CEO duality, size of the board, ROE, and Tobin’s Q. Province controls include the lagged provincial GDP. Industry and time fixed effects are included in all estimations. Standard errors, clustered at the industry level, are shown in brackets. The detailed definitions of variables are in Table A1. *, **, and *** denote significance at the 10, 5, and 1% level, respectively.
and the last SEOs, the logarithmic total assets, firm profitability (ROE), leverage ratio, stock volatility, firm’s annual growth rate of sales, and extra administrative expenses. Consistent with Bo et al. (2011), we also include three theoretical proxies in these three models: (1) Investment, measured as the change in fixed assets scaled by total assets of the firm; (2) Tradeoff, measured by the difference between the firm’s leverage and the average leverage of other firms in the same industry excluding firm \( i \) in the same year; (3) Overvaluation measured as the difference between the firm \( i \)'s market to book ratio (MB) and the average MB of other firms in the same industry excluding firm \( i \) in the same year. Province controls include the lagged provincial GDP. Industry and time fixed effects are included.

Column (1) of Table 12 shows that firms located in more severely affected provinces are less likely to conduct SEOs than their counterparts, which supports Hypotheses 1(a) and 2(a). In addition, Columns (2) and (3) of Table 12 show that SEO announcements are supported by higher CSR scores and more accounting conservative practices Bo et al. (2011) state that Chinese SEOs are mostly motivated by timing the market, which is consistent with the findings of the trend of SEO behaviors around the world (Baker & Wurgler, 2002; Cohen et al., 2007;
DeAngelo et al., 2010). Their results indicate that Chinese listed firms issue SEOs when there are opportunities to take advantage of market overvaluation. Corbet et al. (2020) and Haroon and Rizvi (2020) conclude that pandemic affected firms must face more financial difficulties

**TABLE 10** The impact of SEO announcement on firms' market value and underpricing during the pandemic based on an alternative CSR proxy

| Variables | (1) CAR\([−1,1]\) | (2) CAR\([−1,1]\) | (3) Underpricing | (4) Underpricing |
|-----------|------------------|------------------|------------------|------------------|
| Post × mortality × ln_donation | 0.052*** | 0.004*** | | |
| | (0.007) | (0.000) | | |
| Post × mortality × ln_donation × spread | −0.005* | | 0.078** | |
| | | | (0.001) | |
| Firm control | Yes | Yes | Yes | Yes |
| Province control | Yes | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes |
| Observations | 199 | 199 | 199 | 199 |
| R-squared | 0.710 | 0.647 | 0.571 | 0.430 |

Note: Firm controls include leverage ratio, market-to-book ratio, the natural logarithm of market capitalization, institutional shareholding percentages, relative offer size, SEO shares, CEO duality, size of the board, ROE, and Tobin’s Q. Province controls include the lagged provincial GDP. Industry and time fixed effects are included in all estimations. Standard errors, clustered at the industry level, are shown in brackets. The detailed definitions of variables are in Table A1 of the Appendix. *, **, and *** denote significance at the 10, 5, and 1% level, respectively.

**TABLE 11** The impact of SEO announcement on firms’ market value and underpricing during the pandemic based on an alternative accounting conservatism proxy

| Variables | (1) CAR\([−1,1]\) | (2) CAR\([−1,1]\) | (3) Underpricing | (4) Underpricing |
|-----------|------------------|------------------|------------------|------------------|
| Post × mortality × BS_score | 0.022** | −0.131** | | |
| | (0.006) | (0.050) | | |
| Post × mortality × BS_score × spread | −0.233** | −0.073 | 0.095** | |
| | | | (0.004) | |
| Firm control | Yes | Yes | Yes | Yes |
| Province control | Yes | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes |
| Observations | 199 | 199 | 199 | 199 |
| R-squared | 0.288 | 0.289 | 0.380 | 0.400 |

Note: Firm controls include leverage ratio, market-to-book ratio, the natural logarithm of market capitalization, institutional shareholding percentages, relative offer size, SEO shares, CEO duality, size of the board, ROE, and Tobin’s Q. Province controls include the lagged provincial GDP. Industry and time fixed effects are included in all estimations. Standard errors, clustered at the industry level, are shown in brackets. The detailed definitions of variables are in Table A1 of the Appendix. *, **, and *** denote significance at the 10, 5, and 1% level, respectively.
| Variables                          | (1) SEO | (2) SEO | (3) SEO |
|-----------------------------------|---------|---------|---------|
| Post × mortality                  | −0.054*** (0.003) | −0.432 (0.469) | −0.268** (0.106) |
| Post × mortality × CSR            | 0.001* (0.000) |
| Post × mortality × C_score        | 0.059*** (0.002) |
| Mortality × CSR                   | −0.031 (0.063) |
| Post × CSR                        | −0.007 (0.011) |
| Mortality × C_score               | 0.026 (0.062) |
| Post × C_score                    | 0.007 (0.010) |
| CSR                               | 0.008 (0.012) |
| C_score                           | 0.008 (0.010) |
| Mortality                         | 0.224 (0.386) | 0.426 (0.478) | 0.237 (0.498) |
| Leverage                          | 2.284 (1.882) | 1.931 (1.520) | 2.378 (1.933) |
| Overvaluation                     | 0.202*** (0.001) | 0.318** (0.085) | 0.227*** (0.004) |
| Tradeoff                          | −2.289 (1.890) | −1.934 (1.524) | −2.390 (1.939) |
| Investment                        | −2.570 (3.987) | −1.675 (3.233) | −1.909 (2.156) |
| Gap                               | 0.310 (0.196) | 0.395*** (0.007) | 0.213 (0.179) |
| Sales_growth                      | −0.005 (0.010) | −0.002 (0.026) | 0.001 (0.006) |
| EAE                               | −1.976 (3.267) | −1.239 (4.513) | −2.178 (2.225) |
| Firmsize                          | −0.021 (0.212) | −0.045 (0.048) | −0.016 (0.020) |
| ROE                               | 0.078*** (0.000) | 0.030** (0.001) | 0.198** (0.020) |
and investment uncertainties in the market, which make these firms’ advantage of market overvaluation hardly exploited.

To confirm whether market timing is the major reason caused SEO announcements during the pandemic, we conduct four more estimations reported in Table 13. In Column (1) of Table 13, we use overvaluation as the dependent variable and find out that the firms from more severely affected areas are 7.1% less likely to be overvalued, compared to last year. This further supports our finding that the major reason for the SEO announcements during the pandemic is still market timing because firms from more severely affected areas are hardly overvalued during the pandemic since investors are uncertain about their financial health (Corbet et al., 2020; Haroon & Rizvi, 2020). Thus, this causes firms from those areas suffering from less SEO issuance and more negative CAR. In Column (2) of Table 13, we conduct the Difference-in-differences (DDD) estimation and examine the interaction between the overvaluation and the main interest Post \times Mortality. We find that overvalued firms are more likely to issue SEOs in the pandemic affected areas, by 5%, compared to their counterparts.

The estimated coefficient for the proxy of the tradeoff theory (Tradeoff), as shown in Column (2) is insignificant, indicating that firms are less likely to use SEOs to adjust its capital structure during the pandemic, especially the firms from severely affected provinces by the pandemic with higher leverage ratios, which is consistent with the tradeoff theory (Modigliani & Miller, 1958). Based on the tradeoff theory, Marsh (1982) and Hovakimian, Opler, and Titman (2001) suggest that firms whose leverage ratio is higher than their optimal level are more likely to issue SEOs to lower their leverage. However, the tradeoff theory is not significantly applied to Chinese SEO practices (Bo et al., 2011). The fixed investment (Investment) is also insignificant, as shown in Column (3), suggesting that financing for investment might not be a significant motivation for firms to issue SEOs during the pandemics.

Table 12 (Continued)

| Variables | (1) SEO | (2) SEO | (3) SEO |
|-----------|---------|---------|---------|
| Volatility3 | 1.23*** (0.001) | 1.58*** (0.011) | 0.876*** (0.000) |
| ln_GDP | 6.684 (4.750) | 1.724*** (0.545) | 2.765 (3.769) |
| Time FE | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes |
| Observations | 5,300 | 5,300 | 5,300 |
| R-squared | 0.766 | 0.814 | 0.762 |

Note: We control the lagged firm characteristics, including the number of years between the current SEOs and the last SEOs, the logarithmic total assets, firm profitability (ROE), leverage ratio, stock volatility, firm’s annual growth rate of sales, and extra administrative expenses. According to Bo et al. (2011), we also include three theoretical proxies: (1) Investment, measured as the change in fixed assets scaled by total assets of the firm; (2) Tradeoff, measured by the difference between the firm’s leverage and the average leverage of other firms in the same industry excluding firm i in the same year; (3) overvaluation measured as the difference between the firm i’s market to book ratio (MB) and the average MB of other firms in the same industry excluding firm i in the same year. Province controls include the lagged provincial GDP. Industry and time fixed effects are included in all estimations. Standard errors, clustered at the industry level, are shown in brackets. The detailed definitions of variables are in Table A1 of the Appendix. *, **, and *** denote significance at the 10, 5, and 1% level, respectively.
Consequently, the major reason caused Chinese SEO issuances during the pandemic is market timing.

6 | CONCLUSION

This study provides empirical evidence to the literature by considering the outbreak of COVID-19 and its impacts on Chinese firms that raise their financial capital through SEOs. As the outbreak is unexpected, research on its impact on China’s financial market is important and necessary. This study sheds new light on the interior of market reactions to SEO announcements in China, which has not been fully explored in previous literature.

Our findings indicate that market investors would respond more negatively to SEO announcements by firms in the more pandemic-affected regions relative to those from less-affected areas. Furthermore, SEO firms with a higher CSR score and engage in conservative accounting face fewer losses in firm values since they have less information asymmetry. Eventually, the SEO firms located in provinces significantly affected by the pandemic have higher underpricing relative to their counterparts since they have more information asymmetry. This effect could be mitigated via higher CSR investments and more accounting conservatism involvement by shrinking the information asymmetry between SEO announced firms and...
outside investors. We also believe that the intention of Chinese SEO issuance during the pandemics is mainly motivated by market timing.

Our study has three possible implications. First, our study shows the insides of CSR efforts and accounting and reporting practices for the effectiveness of Chinese stock market and other emerging markets. Therefore, good CSR performances and accounting conservatism practices could motivate the SEO issuance at all situations, especially for those firms previously significantly affected in the post-pandemic period. Second, our study explores the positive implication of how listed firms react to exogenous market crisis. Third, because market investors would respond more negatively to SEO announcements and undergo more SEO underpricing for firms from regions significantly affected by the pandemic than those firms from the less-affected regions, firms located at regions significantly affected by the pandemic should be more concerned about market timing when issuing SEOs during the crisis. China’s stock market has experienced a big boom after the pandemic. According to a report from STCN.com, about 400 stocks have set historic highs since the beginning of July. Turnovers in the benchmark Shanghai Composite Index and Shenzhen Component Index continued to climb and reached a total of 1.57 trillion ($224 billion) yuan on July 15. Between April 27 and July 15, both Shanghai and Shenzhen Composite Indexes increased from 2815 to 3361 and from 10,452 to 13,734 respectively (Shen, 2020). On January 5, 2021, the CSI 300 index, which tracks the value of the biggest listed companies on the Shanghai and Shenzhen stock markets, closed at 5368 points with an 1.9% increase, the highest level since January 2008, which indicates that China’s economy achieved a faster recovery than expected at a time when the rest of the world is still struggling with increasing infections and severe disruption to business and social life caused by the pandemic (Partington, 2021).

Future research might investigate the association between the market reactions and announcements of SEOs from the worldwide perspective since COVID-19 has a pandemic effect. In addition, other moderating variables, like managerial or institutional shareholding, could be considered as a corporate governance mechanism that influences firms' SEO behaviors.

ADDENDUM

This paper is based on Chinese listed firms' SEO practices during the pandemic period. Chinese SEOS are significantly critical due to the following reasons. Firstly, the emerging Chinese stock market is playing an increasingly important role in the global financial markets (Bo et al., 2011). Secondly, according to Huang and Song (2006), over 50% of Chinese listed firms’ capital comes from external financial sources, while equity financing consists of over 50% of external financing. A study from Bo et al. (2011) further echoes that Chinese listed firms are mainly using equity financing, in particular SE Os, as a dominant channel of raising external capital.

Since 2006, a total of 4348 SEOs had been issued in both Shanghai and Shenzhen stock exchanges. In particularly, 831 and 808 SEO cases were released in 2015 and 2016 respectively. In 2015, the funds raised reached RMB 1366 billion, while in 2016 the SEO funds reached RMB 1683 billion. In 2018 and 2019, the number of the SEO firms were 313 and 223, with raising capital of RMB 850 billion and 700 billion, respectively (sources from: http://www.sse.com.cn/). Over the past few years, the ratio of capital raised through SEOS by non-financial Chinese firms
to their market capitalization was even much higher than the ratio for US counterparts (Kim, Kim, Li, Lu, & Shi, 2020).

As a result, it is intriguing to explore the major capital raising practices, SEOs, for Chinese listed firms during the COVID-19 pandemic since many of the listed firms have experienced severe financial distress (Ruiz Estrada et al., 2020) and enormous uncertainties have incurred in the Chinese financial market, especially for the firms from areas significantly affected by the pandemic.

ENDNOTES

1 Data are collected from https://www.gtarsc.com and https://www.cnrds.com.

2 All the DID estimations pass the common trend test.

3 We estimate the information asymmetry level of all the listed firms based on their daily percent quoted bid-ask spreads for each firm-day over our sample period and reach a similar conclusion.

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| Variables   | Definitions                                                                                                                                 |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| CAR[-1,1]  | The cumulative abnormal return over the event window [-1,1].                                                                                    |
| CAR[-7,7]  | The cumulative abnormal return over the event window [-7,7].                                                                                   |
| CARP       | A dummy variable which is equal to one if a firm’s CAR[-1,1] is positive and zero otherwise.                                                |
| CARN       | A dummy variable which is equal to one if a firm’s CAR[-1,1] is negative and zero otherwise.                                                  |
| Underpricing | SEO underpricing level on the first trading day of the SEO stock.                                                                          |
| SEO shares | The proportion of SEO shares sold by existing shareholders to the total SEO shares offered.                                                   |
| SEO        | A dummy variable which is equal to one if a firm conducts SEO during the sample period and zero otherwise.                                  |
| Relative offer size | The number of shares offered divided by the total shares outstanding prior to the SEO announcement.                                |
| CSR        | The firm’s CSR scores from the CNRDS.                                                                                                         |
| C_score    | Accounting conservatism indicator conducted by Khan and Watts (2009)                                                                          |
| BS_score   | Accounting conservatism indicator conducted by Ball and Shivakumar (2006)                                                                     |
| Spread     | Daily percent quoted bid-ask spreads for each firm-day over 60 trading days prior to the SEO announcement.                                  |
| Leverage   | The firm’s total debt versus total asset.                                                                                                     |
| Market-to-Book ratio | The firm’s market to its book value.                                                                                                           |
| Ln(Market cap) | The natural logarithm of the firm’s market capitalization.                                                                                 |
| Tobin Q    | The ratio between a firm’s physical asset’s market value and its replacement value.                                                          |
| ROE        | The firm’s net income versus total equity.                                                                                                    |
| Ln(Board Meeting) | The natural logarithm of the firm’s board meeting frequencies.                                                                                   |
| Board size | Size of the board of the firm.                                                                                                               |
| CEO duality | A dummy variable that is equal to one if the firm’s CEO is also the chairman of the board of directors and zero otherwise.                  |
| Institutional ownership | The firm’s institutional investor share percentage.                                                                                           |
| Stock return | The stock return of the firm over the sample period.                                                                                         |
| Trading Volume | The logarithmic trading volume of the firm over the sample period.                                                                            |
| Ln(Donation) | The natural logarithm of the firm philanthropic donation during the pandemic.                                                                |
| Gap        | The number of years between the current SEOs and the last SEOs                                                                              |
| Tradeoff   | The difference between the firm $i$’s leverage and the average leverage of other firms in the same industry excluding firm $i$ in the same year. |
| Overvalue  | The difference between the firm $i$’s market to book ratio (MB) and the average MB of other firms in the same industry excluding firm $i$ in the same year. |
| Sales_Growth | The firm’s annual growth rate of sales.                                                                                                        |
| Investment | The change in fixed assets scaled by total assets of the firm.                                                                               |

(Continues)
| Variables  | Definitions                                                                                                                                 |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Volatility1| Standard deviation of daily close-to-close returns over the 30 trading days ending 11 days prior to SEO.                                      |
| Volatility2| Standard deviation of returns for firm $i$ in month $t$.                                                                                   |
| Volatility3| The difference between the standard deviation of the firm $i$’s daily stock returns and the average standard deviation of daily returns of other firms in the same industry excluding firm $i$. |
| Firm_size  | The logarithmic total assets of the firm.                                                                                                   |
| EAE        | The difference between the firm $i$’s administrative expenses and the average administrative expenses of other firms in the same industry excluding firm $i$ in the same year. |
| Mortality  | The number of the provincial COVID-19 mortality scaled by the total death in China by May 31, 2020.                                           |
| Ln(GDP)    | The natural logarithm of the provincial GDP.                                                                                               |