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Corporate policies and outcomes during the COVID-19 crisis: Does managerial ability matter?

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ABSTRACT

The devastating impacts of the COVID-19 pandemic have forced firms to formulate strategies that can help them effectively cope with the crisis. In this study, we investigate whether and how managerial ability affects the corporate policies during the COVID-19 crisis. Specifically, we investigate how managerial ability affects the policies of firms related to investment, financing, cash holdings, and dividend payouts. We also explore whether firm performance is influenced by managerial ability. Using quarterly data of Chinese firms during 2020, results show that firms with higher ability managers reduce their investments, financing, and cash holdings, yet increase their dividend payouts during the COVID-19 crisis. Findings also indicate that firms having more capable managers tend to outperform those having less capable managers. Results of our additional analyses reveal that general ability carries more value than special ability and that managerial ability has varying effects on state-owned and non-state-owned firms. These results contribute to the literature by highlighting managerial ability as a critical determinant of firm performance and policies at times of uncertainty.

1. Introduction

The highly infectious novel coronavirus (COVID-19) has induced a different and more severe version of the contagion phenomenon. The COVID-19, discovered for the first time in Wuhan, China in December 2019, has spread globally, with over 200 countries reporting cases as of April 2020 (Jebran and Chen, 2021; Zaremba et al., 2020). To curb the further spread of the virus, countries have implemented various restrictions, such as lockdowns, social distancing measures, business closures, curfews, and limited cross-border movements (Goodell, 2020; Phan and Narayan, 2020; Zhang et al., 2020). Although helpful in slowing down the spread of COVID-19, these measures had devastating impacts on economies and financial markets all over the world, thereby triggering one of the most severe economic crises ever recorded in history. Specifically, many countries have entered a recession following the outbreak, stock markets have become highly volatile, investors have sold off their shares leading to a significant decline in stock prices, trade activities have been restricted, the prices of commodities (e.g., oil and gold) have reached all-time lows, and the global economic uncertainty has reached its peak (Ashraf, 2020; Baker et al., 2020; Baldwin and Weder di Mauro, 2020; Gharib et al., 2020; Zaremba et al., 2020; Zhang et al., 2020). The pandemic has also severely affected firms around the world, particularly those operating in the tourism and aviation industries mainly due to the limited mobility resulting from travel restrictions.

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1.1. How can firms make effective decisions amid the COVID-19 pandemic?

To answer this question, we examine how managerial ability affects the decisions of firms during the COVID-19 crisis by using secondary data on four key aspects, namely, investment, financing, cash holdings, and dividend payout. Besides, we also investigate how managerial ability influences firm performance. We focus on these four important managerial decisions because they have a profound impact on organizational performance during the current crisis. For example, we focus on investment and financing decisions because they are critically important given their potential effects on the operations and survival of firms. We consider cash holdings decisions because holding cash is especially important at times of uncertainty. We also focus on dividend payouts decision, which is relatively important to retain shareholders, especially during a crisis. Finally, we focus on the most important organizational outcome – firm performance.

1.2. Why is managerial ability important during a crisis?

We refer to the literature on managerial ability to answer this question. Previous studies have highlighted managerial ability as among the most important managerial attributes that define the success of an organization. Those managers possessing high ability are known to be highly knowledgeable about their businesses, industries, and products, can make better judgments compared with other managers, can efficiently manage their employees, and have rich amounts of information regarding future trends and technologies (Demerjian et al., 2012; Demerjian et al., 2013). These studies also posit that those firms having high ability managers tend to show greater levels of innovation (Chen et al., 2015), make highly efficient investment decisions (Gan, 2019; Habib and Hasan, 2017), demonstrate a greater organizational performance (Chang et al., 2010; Chuah and Foong, 2019), and achieve higher-quality earnings reporting (Demerjian et al., 2013; García-Meca and García-Sánchez, 2018). Several studies have also investigated how firms make decisions during uncertainty and highlighted how managerial capability plays a key role amid a crisis. For example, Andreou et al. (2016) find that highly capable managers can minimize the negative effects of a crisis by taking less risks and reducing bank liquidity. Andreou et al. (2017) argue that higher ability managers can increase the firm value during a crisis by making highly efficient investment decisions. Chen and Lin (2018) illustrate that highly capable managers tend to demonstrate a better performance when faced with high uncertainty and call for future inquiries into how managerial ability plays its role at times of uncertainty. These studies all underscore the importance of managerial ability during a crisis. Therefore, we investigate how such ability affects corporate decisions and outcomes during the COVID-19 crisis.

We test our core assumptions using Chinese firms for two reasons. On the one hand, as the first country in the world to report a case of COVID-19 infection, China is also the very first country that attempted to curb the spread of the virus by introducing various measures, including business closures, social distancing, lockdowns, and travel restrictions, all of which greatly affected the operations of firms in the country. On the other hand, the availability of the quarterly data of Chinese firms has made it possible to understand in more detail what these firms have gone through during the onset of the pandemic. In addition, compared to developed countries, emerging economies are more strongly affected by the crisis. Hence, examining the phenomena in the largest emerging economy of the world also provide a valid reason for investigation. Taken together, these factors offer an ideal setting for exploring the effects of managerial ability on the decisions and outcomes of firms at times of crisis.

For our core analysis, we adopted the method of Demerjian et al. (2012) to measure managerial ability. This method measures the ability of managers in terms of their efficiency in transforming available resources into revenues compared to their industry peers. A manager is considered “high ability” if s/he can either obtain high revenue from a certain amount of resources or reduce the amount of resources that a firm usually consumes to generate revenue. Following this method, we compute managerial ability for the year 2019 to ensure that our measure is not influenced by crisis period shocks. Meanwhile, we only used the data for the first three quarters of 2020 to evaluate core corporate decisions and outcomes. Specifically, we used data on expenditures in capital assets and mergers and acquisitions (M&A) to investigate investment decisions, short-term and long-term debt leverage data to investigate financing decisions, cash dividends data to investigate dividends payout decisions, cash and cash equivalents data to investigate cash holdings decisions, and return on assets and return on shareholders’ equity to investigate firm performance.

Several notable insights can be obtained from our analyses. For instance, managerial ability shows a negative relationship with investment in capital assets during the COVID-19 crisis, but not with M&A investments. Managerial ability also has significant negative effects on both short- and long-term leverage. In terms of dividend payouts, the analysis indicates an insignificant positive effect of managerial ability on dividend payouts. However, when additional measures of managerial ability are used, managerial ability shows statistically significant and positive effect on dividend payouts. Managerial ability also shows a significantly negative influence on cash holdings. Finally, the findings indicate a significantly positive influence on both return on assets and return on shareholders’ equity. By further classifying the ability of CEOs into general and special abilities, we find that the decisions and performance of firms are strongly influenced by general abilities than by special abilities. Managerial ability also plays a more significant role in non-state-owned firms than in state-controlled ones. These findings support our contention that the decisions and outcomes of firms during the COVID-19 crisis are determined by managerial ability.
This work contributes to the literature in two ways. First, although studies have been carried out with the aim to investigate and assess the implication of COVID-19 on economy, industry, market performance and on other aspects, only a few have examined corporate policies in response to COVID-19 pandemic (e.g., Ali, 2021; Flammer and Ioannou, 2021). To fill such gap, we thoroughly investigate the policies formulated by firms during the COVID-19 pandemic with a specific focus on the role of managerial ability in designing such policies. Our findings show that firms with higher ability managers reduce investment, financing, and cash holdings during the pandemic but increase their dividend payouts. Most importantly, firms with high ability managers also outperform those having lower ability managers. These findings underscore the importance of managerial ability in the performance and survival of firms during the COVID-19 crisis. While not all of these policies may be deemed important during the COVID-19 pandemic, managerial ability still emerges as a critical determinant of the firm policies during this crisis period.

Second, we contribute to the managerial ability literature by highlighting its importance during crisis. While Andreou et al. (2017) confirm that managerial ability plays a significant role at times of uncertainty, their study only considers the investment behavior of firms under the global financial crisis. We expand the literature by comprehensively analyzing the determining role of managerial ability for the performance and decisions of firms during the COVID-19 crisis which differs from the financial crisis. We find that during the pandemic, having higher ability managers can reduce the short-term and long-term debt financing, cash holdings, and investments of firms but increase their dividend payouts. Overall, those firms having higher ability managers outperform those that are led by lower ability managers during the COVID-19 crisis. Moreover, the general abilities, rather than the special ones, of managers are particularly critical during the COVID-19 crisis. We also contribute to the literature by highlighting the varying effect of managerial ability across state-owned and non-state-owned firms.

The rest of this paper is organized as follows. Section 2 reviews the literature and proposes the hypotheses. Section 3 describes the research methodology. Section 4 presents the empirical results. Section 5 concludes the paper and highlights its implications.

2. Literature and hypothesis

2.1. Review of literature on managerial ability

Researchers over the past few decades have debated how the decisions and outcomes of firms are influenced by managerial characteristics. These studies have identified several managerial attributes, such as gender, expertise, past experiences, age, tenure, and elite education, that are associated with corporate decisions (e.g., Custódio and Metzer, 2014; Finkelstein and Hambrick, 1990; Graham et al., 2013; Hackbarth, 2008; Jebran et al., 2020; Malmendier et al., 2011). One research stream examines managerial ability and its underlying effects on the firm’s decisions. Managerial ability is considered a key intangible asset of firms given its profound influence on organizational efficiency. Those managers with greater ability are often assumed to be knowledgeable about their industries and firms, and such knowledge is critical in improving firm performance (Andreou et al., 2017; Chang et al., 2010; Gong et al., 2020). Therefore, managerial ability is also key to the survival of firms (Demerjian et al., 2012; Zhao et al., 2016).

Previous studies have shown that the decisions and outcomes of firms are significantly influenced by managerial ability. For example, having higher ability managers improves the internal control and reporting quality of firms (García-Meca and García-Sánchez, 2018; Li, 2015), increases their tendency to issue management earnings forecasts (Baik et al., 2011), boosts their earnings quality (Demerjian et al., 2013), triggers more innovation output (Chen et al., 2015), reduces their earnings management (Huang and Sun, 2017), introduces highly favorable investment opportunities and enhances their investment efficiency (Gan, 2019; Lee et al., 2018), and ensures a higher social responsibility performance (Yuan et al., 2019). Studies have also demonstrated that firms with higher ability managers tend to have higher performance compared to those with lower ability managers (e.g., Chang et al., 2010; Chuah and Foong, 2019; Gong et al., 2020; Silva, 2010).

Although the importance of managerial ability has been highlighted in the literature, few researchers have argued that higher managerial ability may adversely affect organizations. For example, Habib and Hasan (2017) argue that higher ability managers have a tendency to over-invest and make inefficient investment decisions, which lead to negative information hoarding and consequently increasing the risk for stock price crash. Koester et al. (2017) indicate that capable managers have superior understandings of their organization which helps them to devise complex tax avoidance strategies, which reduces cash tax payments. Gul et al. (2018) find that financially distressed firms managed by higher ability managers have lower accruals quality and a higher likelihood of restatement. Cheng and Cheung (2021) provide support for the rent-extraction view by indicating that higher ability managers used derivatives to increase firm risks for rent-seeking purpose.

Overall, it is assumed that higher managerial ability is critically important for organizational performance because more capable managers outperform their less capable counterparts even in times of uncertainty (Andreou et al., 2017; Chen and Lin, 2018; Gong et al., 2020). Therefore, we investigate the crucial role of managerial ability in explaining the policies and outcomes of firms during the COVID-19 crisis. We focus on several key policies, such as those related to financing, investments, cash holdings, and dividend payouts, and also examine how the performance of firms during the COVID-19 pandemic is influenced by managerial ability.
2.2. Hypothesis

In this section, we develop hypotheses related to the influence of managerial ability on corporate policies and performance. Our first aim is to examine how the corporate investments during the COVID-19 crisis are affected by the managerial ability. Prior studies indicate that corporate investments significantly reduce during a crisis (e.g., Bo et al., 2014; Campello et al., 2010; Duchin et al., 2010; Kahle and Stulz, 2013). Such reductions can be ascribed to two factors. First, the amount of external financing resources is significantly reduced during a crisis. From the perspective of credit supply shocks, crises greatly affect credit-dependent firms (Duchin et al., 2010). Therefore, a sudden reduction in the supply of credit following the onset of a crisis can significantly reduce corporate investment. Duchin et al. (2010) noted that investment significantly reduced during the crisis and this reduction was more significant in firms with fewer internal resources (net short debt and cash reserves), firms operating in industries highly dependent on external financing, and financially constrained firms. By using a sample of 1050 CFOs from the US, Europe, and Asia, Campello et al. (2010) find that many firms are deprived of investment opportunities during a crisis due to their reduced external borrowing ability. From this perspective, we assume that firms are likely to reduce investments during a crisis.

Second, from the perspective of the collateral channel or the balance sheet multiplier effect [see a review by Brunnermeier and Oehmke, 2013], a crisis can significantly compress the balance sheet of firms, thereby reducing the amount of assets, which can be used as collateral for debt financing. Therefore, these firms are deprived of financial resources during a crisis, which would then significantly reduce their capital expenditures. Duchin et al. (2010) find evidence that corporate investment significantly reduce following the onset of the financial crisis, consistent with a causal effect of a supply shock. However, the adverse effect of the crisis is significantly lower for firms with internal resources, such as cash reserves. Following the above arguments, we argue that having talented managers increases the tendency for firms to utilize their internal resources for investment. However, these managers tend to reduce their investments during the COVID-19 crisis considering that the pandemic has significantly reduced the availability of internal and external resources for their firms. We therefore hypothesize that:

**Hypothesis 1.** Managerial ability is negatively associated with corporate investment during the COVID-19 crisis.

Our next aim is to examine how financing decisions are influenced by managerial ability. For two reasons, we assume that managerial ability is negatively associated with debt financing during the COVID-19 period. First, managers having the ability to achieve higher operating performance are less likely to consider debt financing because of the higher costs associated with external financing. Studies suggest that firms with high ability managers have a lower likelihood to consider debt financing. For example, Choo et al. (2021) show that firms with high ability managers, especially firms with good governance and without financial constraints, have lower loan financing compared with other firms. Cho et al. (2021) also reveal a negative relationship between firm capital structure adjustment and managerial ability. In addition, Puwanenthiren et al. (2019) indicate that managerial ability is positively associated with equity financing and this association is prevalent for firms having high information asymmetry. Following these arguments, we posit that higher ability managers have a lower tendency to consider debt financing because of their strong ability to improve performance which can be used for reinvestment.

Second, firms face severe difficulties in securing external funds during a crisis given the reluctance of lenders to offer loans (e.g., Ivashina and Scharfstein, 2010). Crises can trigger increased economic uncertainties, which would significantly increase default risk, information asymmetry, and debt financing costs (Tran, 2021; Zhang et al., 2015). Given these difficulties resulting from financial crises, firms tend to have lower leverage ratios (Demirgüç-Kunt et al., 2020). We therefore hypothesize that firms with high ability managers have lower leverage ratios during the COVID-19 crisis.

**Hypothesis 2.** Firms with higher ability managers have lower leverage ratios during the COVID-19 crisis compared to firms with lower ability managers.

We further investigate how managerial ability affects dividend payouts. We ascribe our hypothesized relationship between dividend payouts and managerial ability during the COVID-19 pandemic to two reasons. First, we assume that by having higher ability managers, firms can pay a lower dividends during the COVID-19 pandemic. Specifically, firms that are managed by higher ability managers have a larger propensity to gain higher rates of returns and thereby have a greater propensity to generate profits, which can be further used for reinvestment (Jiraporn et al., 2016). From this perspective, higher ability managers are less likely to pay dividend because of their intentions to use profits for reinvestment purposes.

Second, we posit a positive relationship between dividend payouts and managerial ability during the COVID-19 crisis. Studies based on the Lintner (1956) work suggest that managers tend to adjust their dividend payouts based on the net earnings flow. Therefore, when firms have higher earnings ratios, they have a higher propensity to pay dividends and vice versa. From this perspective, we expect that firms led by higher ability managers are likely to pay dividends, when they achieve higher performance during the COVID-19 crisis. Andreou et al. (2017) indicate that firms with capable managers achieved higher performance during the global financial crisis. In addition, studies (e.g., Jiraporn et al., 2016; Park and Song, 2019) argue that more capable managers are not afraid of paying dividends and have low concerns about reducing it later because of their confidence in their ability to keep firms
profitable. In addition, firms may also maintain their dividend policy in order to show their financial prospect during a crisis (Ali, 2021). Considering that firms with higher ability managers have a stronger likelihood to achieve higher performance during the COVID-19 crisis, the propensity to pay dividend payouts increases. Following these arguments, we hypothesize that:

Hypothesis 3a. Managerial ability is positively associated with dividend payouts during the COVID-19 crisis.

Hypothesis 3b. Managerial ability is negatively associated with dividend payouts during the COVID-19 crisis.

We further examine how corporate cash holdings during the COVID-19 crisis are influenced by managerial ability. The precautionary view (Keynes, 1937) suggests that firms tend to increase cash holding when a cash flow shock occurs. Because a crisis is an exogenous shock, a high uncertainty induced from a crisis may reduce a firm’s access to credit and significantly increase their external financing costs. Therefore, as a precaution, firms start hoarding cash that they can use to overcome contingencies and seize investment opportunities. This precautionary view has been supported in previous studies that point toward the cash hoarding behavior of firms during a crisis [see Amess et al., 2015; da Cruz et al., 2019 for detailed reviews]. In line with this view, we posit that during the COVID-19 crisis, higher ability managers may hoard more cash to support their firms.

Although, majority of the studies support the precautionary view of hoarding more cash during a crisis; however, some researchers argue that such cash hoarding behavior is not applicable to all firms. Specifically, some studies suggest that even at times of economic uncertainty, firms without financial constraints have a lower propensity to increase their cash holdings (e.g., Almeida et al., 2004; Han and Qiu, 2007). Alvarez et al. (2012) argue that compared to small- and medium-sized firms, large firms hoard less cash during the liquidity crisis because they were less affected by the crisis due to easy access to external resources. Further, Lozano and Yaman (2020) find that firms tend to hoard more cash during a short crisis period, whereas keep less cash during a long crisis period. Considering the aforementioned discussion, a firm’s motive for cash holding may be less likely to be affected by a crisis. We hypothesize that firms with higher ability managers may hold less cash. Because firms with higher ability managers can make efficient decisions during a crisis (Andreou et al., 2017), such firms are likely to achieve higher performance improvements, which may reduce their financial constraints and consequently their motive for hoarding more cash. Hence, firms led by more able managers may hold less cash during a crisis. Therefore, we hypothesize that:

Hypothesis 4a. Managerial ability is positively associated with cash holdings during the COVID-19 crisis.

Hypothesis 4b. Managerial ability is negatively associated with cash holdings during the COVID-19 crisis.

Finally, we explore how managerial ability affects the performance of firms during the COVID-19 crisis. Several studies provide evidence that managerial ability is positively associated with organizational performance. For example, the literature suggests that corporate performance is higher for firms having higher ability managers. By comprehensively analyzing several countries, Silva (2010) find that countries with high ability managers have a higher propensity to use risky projects which leads to higher productivity. Chang et al. (2010) suggest that relative to less capable CEOs, organizational performance is positively affected by more capable CEOs. Chen and Lin (2018) argue that acquisition by firms with more capable managers generates higher announcement abnormal returns and also better post-announcement abnormal returns compared to firms with less capable managers. Chuah and Foong (2019) show that higher ability CEOs with foreign education and working experiences have a positive influence on the firm value compared to other firms.

Previous studies have also highlighted the importance of managerial ability in maintaining organizational performance at times of crisis. For example, Andreou et al. (2016) argue that higher ability bank managers have stronger intentions of risk-taking and liquidity creation during normal periods; but during the crisis, they reduce liquidity creation as a strategy to de-leverage their balance sheets. Andreou et al. (2017) reveal the positive effect of managerial ability on investments during global financial crisis and argue that such effect is particularly obvious among those firms with greater financing access and those firms which are at low risk of facing financial constraints during the crisis. Gong et al. (2020) highlighted the positive effect of managerial ability on organizational performance through CSR practices, especially during a crisis. Following the above discussion, we hypothesize that with their unique skills, abilities, and effective decision making, having higher ability managers boosts the chances for firms to demonstrate performance improvements during the COVID-19 crisis. Hence, we hypothesize that:

Hypothesis 5. Firms led by higher ability managers have a higher performance during the COVID-19 crisis compared to those led by lower ability managers.

3. Methods

3.1. Data

For our analyses, it is important to identify the COVID-19 crisis period. The first COVID-19 case was reported in December 2019 in Wuhan, China. In response to the rapid transmission of this virus across the world, the World Health Organization (WHO) officially declared on March 11, 2019 the beginning of the COVID-19 pandemic. The virus was detected in over 200 countries by the end of April 2020.1 To this end, we set the starting period of the COVID-19 pandemic to the beginning of the year 2020.

1 Data extracted from https://www.worldometers.info/coronavirus/
We considered all A-share non-financial firms listed on the Shenzhen and Shanghai stock exchanges. In order to have a more detailed analysis of the COVID-19 crisis, we consider quarterly data for all dependent variables (corporate policies and performance). We obtained the data for the first three quarters of 2020 (31st March, 30th June, and 30th September), which ensures that our analysis can exactly capture the corporate behavior during the COVID-19 crisis. For our independent (managerial ability) and control variables, we use annual data for the year 2019 (considering pre-crisis managerial ability). Andreou et al. (2017) argue that using pre-crisis managerial ability and control variables ensures that estimated variables are not affected by the consequences arising from the crisis. The data of all variables are obtained from WIND and China Stock Market and Accounting Research databases.

### 3.2. Variables

#### 3.2.1. Dependent variables

Following the literature on corporate policies (e.g., Bernile et al., 2018; Cassell et al., 2012; Duong et al., 2021; Feng and Johansson, 2018; Jiraporn et al., 2011; John et al., 2011), our dependent variables cover four areas, namely, investment policies, financing policies, dividend policies (i.e., payout policies), and cash holding policies (i.e., liquidity policies). Specifically, we employed two traditional variables for financing policies, namely, **Short-debt leverage** (short-term debt scaled by total assets) and **Long-debt leverage** (long-term debt scaled by total assets). For investment decisions, we considered two different policies: **Investment** (change in fixed assets plus depreciation scaled by total assets), and **M&A** (total expenditures in mergers and acquisitions scaled by total assets). We used **Dividend** (measured by cash dividend scaled by total assets) to account for dividend policies, and we used **Cash** (computed as the sum of cash and cash equivalents scaled by net assets [where net assets are computed as total assets minus cash and cash equivalents]) to account for cash holding policies. We regard firm performance as an outcome to understand how managerial ability affects the outcomes of firms during the COVID-19 crisis. We measure firm performance by two widely used measures: **ROA** (earnings before interest and taxes scaled by total assets) and **ROE** (earnings before interest and taxes scaled by total shareholders’ equity).

#### 3.2.2. Independent variable

Our main independent variable is managerial ability. One of the most widely used and reliable measure of managerial ability in literature is proposed by Demerjian et al. (2012). This method captures the ability of the firm’s managers to generate revenue through certain inputs. As previously discussed, we intend to estimate the managerial ability in the pre-COVID crisis period by considering 2019 as a reference year. Andreou et al. (2017) argue that it is better to measure managerial ability in the pre-crisis period as it can ensure that the measurement is not influenced by the crisis period. In addition, using pre-crisis managerial ability can also address the endogeneity issues. Therefore, we used annual data for the year 2019 for all variables used in the measurement of the managerial ability variable.

Demerjian et al. (2012) argued that high ability managers should be able to generate more revenue with limited resources or consume fewer resources to generate the same revenue compared to their industry peers. They proposed a two-step approach to measure managerial ability. In the first step, data envelopment analysis (DEA), which takes into account each firm’s amount and combinations of resources, is computed within the same industry. The efficiency score of a firm in the efficient frontier is one. The greater the distance from the efficient frontier, the lower is the efficiency score. In the second step, the DEA efficiency scores obtained from step one are regressed by using certain firm-specific characteristics. The first step for firm efficiency scores defined as the ratio of outputs over inputs using the DEA optimization problem is given as:

\[
\max_{\theta} \quad \text{SALES} = \hat{\alpha}_{1}\text{COGS} + \hat{\alpha}_{2}\text{SGA} + \hat{\alpha}_{3}\text{PPE} + \hat{\alpha}_{4}\text{R&D} + \hat{\alpha}_{5}\text{LEASE} + \hat{\alpha}_{6}\text{INTANG} + \hat{\alpha}_{7}\text{GOODWILL}
\]

where SALES represents operating revenue; COGS indicates cost of goods sold; SGA denotes selling and general administrative expenditures; PPE denotes property plant and equipment; R&D denotes research and development expenditures; LEASE denotes operating and financial leases; INTANG denotes intangible assets; and GOODWILL denotes goodwill. In Eq. (1), SALES is the output variable, whereas the input variables are COGS, SGA, PPE, R&D, LEASE, INTANG, and GOODWILL. The theory behind this inputs is because they all contribute to generating revenue for firms and in fact, these inputs are affected by managerial ability since each input is subject to managerial discretion (Demerjian et al., 2012). The results from the firm efficiency DEA model provide efficient frontiers which measure the amount and mix of resources used to generate revenue by firms within each industry. A value one has been assigned to firms operating on the frontier and a value zero has been assigned to least efficient firms.

Following Demerjian et al. (2012), in the second step, we regressed the efficiency scores on firm-specific attributes, which include market share, firm size, positive cash flows, firm age, number of segments, and foreign currency gains. Specifically, we used a Tobit regression by regressing the DEA efficiency scores on the aforementioned firm-specific characteristics as:

\[
\text{FirmEfficiency}_i = \alpha_0 + \alpha_1\text{SIZE}_i + \alpha_2\text{MS}_i + \alpha_3\text{FCF}_i + \alpha_4\text{AGE}_i + \alpha_5\text{BUSEG}_i + \alpha_6\text{FCG}_i + \epsilon
\]

where SIZE denotes the natural log of total assets; MS represents the ratio of firm revenue to total industry revenue; FCF is a variable set to 1 if free cash flow (income before depreciation – change in capital expenditure – change in operating capital) is greater than 0; AGE

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2 For calculation of some of the variables (such as change in fixed assets), we used data for the last quarter of 2019.

3 We also used data from the year 2018 for calculation of some variables (such as change in operating capital and change in capital expenditure).
denotes firm’s age; BUSEG indicates the number of business segments; FCG represents foreign currency gains. The residual term \((\varepsilon_i)\) captures the effect of firm efficiency attributed to managerial ability for the year 2019 and is denoted by \textit{Managerial ability}.

It is important to note that our measure of managerial ability utilizes information from the fiscal year 2019 which has several advantages. First, Andreou et al. (2017) suggest that measuring managerial ability before the crisis period ensures that the measurement is less likely to be spuriously related to unobserved within-firm specific changes in corporate policies following the onset crisis. Second, we are able to examine the cause–effect relationships by including dependent variables in the subsequent period \((t+1)\). Finally, using lagged independent variables, we are also able to control endogeneity issues. Given these advantages, we used the pre-COVID (2019 fiscal year) managerial ability in our analysis.

Finally, we noted that the statistics of \textit{Managerial ability} variable reported in Demerjian et al. (2012) differ from those presented in Table 1 given the differences in the Chinese and US contexts. To ensure the accuracy of our managerial ability measure, we conducted a robustness check following Demerjian et al. (2012) in computing the other proxies of managerial ability, namely, \textit{CEO Compensation} (natural log of compensation), \textit{CEO Tenure} (natural log of tenure), \textit{CEO Media} (natural log of CEO mentions in the media), \textit{Historical ROA} (past five-year industry adjusted return on assets), and \textit{Historical Returns} (past five-year industry adjusted stock returns).

Following Demerjian et al. (2012), we examined the correlation between the firm efficiency scores and our measures of managerial ability by using Pearson and Spearman correlation coefficients and additional variables, namely, return on assets and firm size (natural log of total assets). Table A2 in Appendix 1 presents the results. We observed that all other measures of managerial ability (except \textit{CEO Tenure} and \textit{CEO Media}) have significant associations with \textit{Managerial ability}. In addition, all other proxies of managerial ability have significant association with our main proxy of \textit{Managerial ability}, thereby confirming the accuracy of our measure.

3.2.3. Control variables

Following the literature (e.g., Andreou et al., 2017; Chuah and Foong, 2019; Feng and Johansson, 2018; Zhang, 2017), we controlled for several factors. We measured all control variables using 2019 fiscal year data given that we used a pre-COVID measure of our main independent variable. First, we controlled for firm specific variable. Specifically, we computed firm size (\textit{Size}) using the natural logarithm of total assets; leverage (\textit{Leverage}) by dividing total liabilities by total assets; cash flows (\textit{Cash flows}) by dividing operating cash flows by total assets; market-to-book ratio (\textit{MTB}) by dividing market value by the book value of equity; profitability (\textit{Profitability}) by dividing earnings before interest and taxes by total assets; and sales growth (\textit{Growth}) by subtracting the current year sales from the previous year sales and dividing the difference by the previous year sales. Next, we controlled for firm-related governance attributes that may affect our main independent variable (managerial ability). Specifically, we computed for board size (\textit{Board size}) based on the number of board directors; CEO duality (\textit{Duality}) that equals 1 if the CEO also serves as the board chair and

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4 These measures have been used by several prior studies
equal 0 otherwise; and board independence (Independence) based on the number of independent directors. Finally, we controlled for ownership attributes by considering institutional ownership (Institution) based on the proportion of institutional shareholdings; and state ownership (State) by using an indicator variable that equals 1 for state-controlled firms and equals 0 for other firms. In all regressions, we also controlled for both time (using quarterly data) and industry (based on the China Security Regulatory Commission classification).

3.3. Econometric model

We opt for ordinary-least-square regression to investigate the effect of managerial ability on corporate policies and outcomes. Specifically, we applied the following regression model:

\[
\text{Policies/Outcomes} = \beta_0 + \beta_1 \text{Managerial ability} + \beta_2 \text{ControlVariable} + \epsilon_i
\]  

(3)

where Policies/Outcomes indicates our main dependent variables; Managerial ability is our main independent variable; and ControlVariable denotes a set of control variables. Since we are using quarterly data for our dependent variables, so we also controlled for quarter fixed effects. Besides, we also controlled for industry using 2-digit industry classification provided by CSRC because our findings can be affected by several industry-specific factors.

4. Results

4.1. Descriptive statistics

The descriptive statistics for each variable used in the main analysis are listed in Table 1. The mean and standard deviation values of Managerial ability are 0.510 and 0.131 respectively, indicating the managerial ability of Chinese firms. The mean (standard deviation) values of M&A and Investment are 0.037 (0.982) and 0.0002 (0.068) respectively, indicating spending in merger and acquisitions and capital expenditure during COVID-19 crisis period. In terms of financing, Short-debt leverage and Long-debt leverage have mean (standard deviation) values of 0.352 (0.465) and 0.092 (0.181), indicating that Chinese firms prefer short-term financing. In terms of cash dividend payments, the statistics indicate that Dividend has mean and standard deviation values of 0.006 and 0.011, respectively, whereas Cash holdings has mean and standard deviation values of 0.231 and 0.348. In terms of performance statistics during the COVID-19 crisis, the mean (standard deviation) values for ROA and ROE are 0.013 (0.020) and 0.024 (0.047), respectively. In addition, in terms of governance variables, the mean (standard deviation) values for Duality, Board, Independence, Institutional, and State are 0.309 (0.462), 8.351 (1.637), 3.115 (0.525), 0.416 (0.250), and 0.296 (0.456), respectively. Finally, for firm-specific control variables, the statistics indicate mean (standard deviation) values for Size, Profitability, Growth, Leverage, Cash flow, and MTB are 22.260 (1.323), 0.035 (0.121), 0.095 (0.348), 0.428 (0.212), and 1.853 (1.208), respectively.

4.2. Correlation analysis

Table 2 presents the Pearson correlation matrix. Managerial ability is significantly positively correlated with Short-debt leverage, Long-debt leverage, ROA, ROE, and Dividend, significantly negatively correlated with M&A, and insignificantly correlated with Investment and Cash. Managerial ability is also significantly correlated with some of the control variables. These statistics provide preliminary support for our hypothesis that managerial ability is correlated with corporate decisions and outcomes during the COVID-19 crisis. Finally, the observations in Table 2 also indicate that there are no issues of multicollinearity and we also performed VIF tests (unreported) and confirmed that there are no issues.

4.3. Univariate analysis

The univariate analysis results for our main dependent and independent variables are presented in Table 3. We divided our sample into two subsamples firms with high ability and low ability managers based on median-splitting. Afterward, we checked for statistical differences between these two subsamples by performing a mean-difference test. In all cases, t-statistics is statistically significant, thereby confirming the presence of significant differences between two subsamples. Specifically, the statistics indicate that mean values for Short-debt leverage, Long-debt leverage, Dividend, and ROE is higher for sample firms with higher ability managers, whereas, the mean values of M&A, Investment, and Cash are higher for firms managed by less capable managers. We also observed differences in the statistics for control variables between the two subsamples. Overall, the univariate analyses confirm that there are statistical differences across firms with higher ability managers than for those with lower ability managers.
### Table 2

**Correlation matrix.**

| Variables       | A   | B    | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M    | N    | O    | P    | Q    | R    | S    | T    |
|-----------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| M&A             | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Investment      | 0.002 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Short-debt leverage | -0.006 | -0.044 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Long-debt leverage | -0.011 | 0.015 | 0.102 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| ROA             | -0.009 | 0.025 | -0.169 | -0.044 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| ROE             | -0.003 | -0.104 | -0.002 | 0.035 | 0.712 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Dividend        | -0.008 | -0.020 | 0.083 | 0.126 | 0.039 | 0.066 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Cash            | 0.029 | 0.018 | -0.077 | -0.163 | 0.109 | 0.054 | -0.053 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Managerial ability | -0.050 | -0.009 | 0.119 | 0.253 | 0.060 | 0.113 | 0.113 | -0.032 | 1   |      |      |      |      |      |      |      |      |      |      |      |      |
| Size            | -0.073 | 0.019 | 0.093 | 0.319 | 0.113 | 0.139 | 0.101 | -0.051 | 0.083 | 1   |      |      |      |      |      |      |      |      |      |      |      |
| Profitability   | -0.015 | 0.033 | -0.337 | -0.119 | 0.323 | 0.152 | -0.024 | 0.146 | 0.115 | 0.126 | 1   |      |      |      |      |      |      |      |      |      |      |
| Duality         | -0.000 | 0.015 | -0.020 | -0.091 | 0.028 | 0.009 | -0.019 | 0.024 | -0.158 | -0.203 | -0.024 | 1   |      |      |      |      |      |      |      |      |      |
| Board           | 0.014 | -0.009 | -0.015 | 0.115 | 0.001 | 0.011 | 0.040 | -0.008 | 0.207 | 0.286 | 0.075 | -0.159 | 1   |      |      |      |      |      |      |      |      |
| Independence    | 0.017 | 0.002 | -0.003 | 0.118 | 0.002 | 0.016 | 0.034 | -0.009 | 0.264 | 0.336 | 0.066 | -0.113 | 0.719 | 1   |      |      |      |      |      |      |      |
| Institutional   | -0.021 | 0.008 | 0.003 | 0.188 | 0.074 | 0.071 | -0.005 | 0.068 | 0.419 | 0.496 | 0.113 | -0.214 | 0.247 | 0.250 | 1   |      |      |      |      |      |
| Growth          | -0.014 | 0.038 | -0.058 | 0.003 | 0.166 | 0.128 | 0.027 | 0.015 | 0.047 | 0.037 | 0.282 | 0.023 | 0.003 | 0.001 | 0.038 | 1   |      |      |      |      |      |
| Leverage        | -0.016 | -0.052 | 0.060 | 0.448 | -0.165 | 0.037 | 0.184 | -0.195 | 0.363 | 0.390 | -0.313 | -0.095 | 0.093 | 0.124 | 0.147 | -0.017 | 1   |      |      |      |      |
| Cash flow       | 0.003 | 0.046 | -0.165 | -0.056 | 0.293 | 0.168 | 0.014 | 0.139 | 0.013 | 0.061 | 0.300 | 0.0019 | 0.037 | 0.040 | 0.083 | 0.079 | -0.195 | 1   |      |      |      |
| State           | 0.010 | -0.028 | 0.039 | 0.169 | -0.076 | -0.020 | 0.030 | 0.001 | 0.338 | 0.378 | 0.044 | -0.288 | 0.253 | 0.274 | 0.428 | 0.000 | 0.183 | -0.068 | 1   |      |      |
| MTB             | 0.128 | -0.004 | -0.060 | -0.118 | 0.049 | 0.020 | -0.043 | 0.121 | -0.312 | -0.395 | 0.0033 | 0.091 | -0.134 | -0.107 | -0.057 | 0.032 | -0.201 | 0.093 | -0.160 | 1   |

**Notes.** This table reports Person correlation matrix. All variables are defined in Appendix. Bold values indicate significance at the 5% level.
Table 3
Univariate analysis.

|                      | High managerial ability | Low managerial ability |           |           |           | Diff     | t-stat  |
|----------------------|-------------------------|------------------------|-----------|-----------|-----------|----------|---------|
|                      | Mean        | SD       | Observations | Mean        | SD       | Observations |           |           |           |           |
| M&A                  | 0.0169      | 0.0816   | 5510         | 0.0579      | 1.3866   | 5506        | 0.0410*** | 2.19      |
| Investment           | -0.0008     | 0.0940   | 5463         | 0.0013      | 0.0235   | 5355        | 0.0022*   | 1.67      |
| Short-debt leverage  | 0.3333      | 0.2173   | 5510         | 0.3222      | 0.6205   | 5506        | -0.0610*** | -6.89     |
| Long-debt leverage   | 0.1125      | 0.1185   | 5510         | 0.0719      | 0.2259   | 5506        | -0.0405*** | -11.8     |
| Dividend             | 0.0066      | 0.0117   | 5129         | 0.0057      | 0.0110   | 4510        | -0.0009*** | -4.07     |
| Cash                 | 0.2181      | 0.3613   | 5510         | 0.2441      | 0.3348   | 5506        | 0.0260***  | 3.92      |
| ROA                  | 0.0128      | 0.0184   | 5510         | 0.0136      | 0.0222   | 5506        | 0.0008**   | 2.06      |
| ROE                  | 0.0268      | 0.0459   | 5510         | 0.0226      | 0.0470   | 5506        | -0.0042**  | -4.73     |
| Duality              | 0.2410      | 0.4277   | 5510         | 0.3777      | 0.4848   | 5506        | 0.1367***  | 15.69     |
| Board                | 8.6286      | 1.7505   | 5510         | 8.0779      | 1.4640   | 5506        | -0.5506*** | -17.91    |
| Independence        | 3.2159      | 0.5975   | 5510         | 3.0168      | 0.4187   | 5506        | -0.1990*** | -20.24    |
| Institutional       | 0.4928      | 0.2417   | 5510         | 0.3415      | 0.2353   | 5506        | -0.1513*** | -33.28    |
| State                | 0.4214      | 0.4938   | 5510         | 0.1732      | 0.3785   | 5506        | -0.2481*** | -29.59    |
| Size                 | 23.109      | 1.2364   | 5510         | 21.412      | 0.7315   | 5506        | -0.1697*** | -87.67    |
| Profitability        | 0.0452      | 0.0959   | 5510         | 0.0261      | 0.1393   | 5506        | -0.1910*** | -8.35     |
| Growth               | 0.1125      | 0.3663   | 5510         | 0.0806      | 0.3270   | 5506        | -0.0318*** | -4.81     |
| Leverage             | 0.4911      | 0.2013   | 5510         | 0.3634      | 0.2025   | 5506        | -0.1276*** | -33.16    |
| Cash flow            | 0.0590      | 0.0670   | 5510         | 0.0561      | 0.0669   | 5506        | -0.0028**  | -2.24     |
| MTB                  | 1.6185      | 1.0257   | 5510         | 2.0914      | 1.3265   | 5506        | 0.4728***  | 20.92     |

Notes. This table reports univariate analysis by dividing sample into high versus low managerial ability (based on median splitting). Variables definitions are located in Appendix A.

***P < 0.01, **P < 0.05, *P < 0.1.

Table 4
Managerial ability, corporate policies, and outcomes.

|                      | (1) Mean | (2) SD | (3) Mean | (4) SD | (5) Mean | (6) SD | (7) Mean | (8) SD |
|----------------------|----------|--------|----------|--------|----------|--------|----------|--------|
|                      | M&A      | Investment | Short-debt leverage | Long-debt leverage | Dividend | Cash | ROA | ROE |
| Managemenl ability   | -0.188   | -0.155*** | -0.371** | -0.600*** | 0.0048 | -0.213* | 0.0249*** | 0.0523*** |
| Duality              | -0.0337  | (0.0245) | (0.148) | (0.0564) | (0.039) | (0.118) | (0.0062) | (0.153) |
| Board                | -0.0100  | (0.0015) | (0.0091) | (0.0035) | (0.002) | (0.0073) | (0.0003) | (0.009) |
| Independence        | 0.0457*  | (0.0008) | (0.0036) | (0.0013) | (0.000) | (0.0028) | (0.0001) | (0.0003) |
| Institutional       | 0.0019   | (0.002) | (0.0095) | (0.007) | (0.0005) | (0.0156) | (0.0008) | (0.0020) |
| State                | -0.0249  | -0.0037** | -0.0074 | -0.0133*** | -0.0111*** | -0.0008 | -0.0030*** | -0.0053*** |
| Size                 | -0.0065  | 0.0122*** | 0.0725** | 0.0696*** | 0.0000 | -0.0077 | 0.0006 | -0.0000 |
| Growth               | 0.147*** | 0.0043** | 0.0619** | 0.0215*** | -0.0003 | -0.0311*** | 0.0072*** | 0.0125*** |
| Cash flow            | -0.415*** | 0.0130 | -0.159** | -0.117** | 0.1755*** | 0.5299** | 0.0771*** | 0.126*** |
| MTB                  | 0.0730*** | -0.0001 | 0.0442*** | 0.0152*** | 0.0008*** | 0.0099*** | 0.0012*** | 0.0028*** |
| Profitability        | -0.0585  | 0.0143** | -1.068*** | -0.266** | 0.0115*** | 0.0906** | 0.0274** | (0.0003) |
| Leverage             | -0.0810  | -0.0089** | (0.0574) | (0.0040) | 0.0004 | -0.291*** | -0.0185*** | 0.0179** |
| Industry             | Yes      | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      | Yes     |
| Time                 | Yes      | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      | Yes     |
| Constant             | 0.0696   | -0.207*** | -1.245*** | -1.245*** | -0.0037 | 0.547*** | -0.0167* | -0.0301 |
| R²                   | 0.479    | 0.0338  | 0.201    | 0.0768   | 0.00551  | 0.163   | 0.00859  | 0.0212   |
| Observations         | 11.016   | 10.818  | 11.016   | 11.016   | 9639     | 11.016  | 11.016   | 11.016   |

Notes. This table reports the main findings. Variables definitions are located in Appendix A. Standard errors in parenthesis.

***P < 0.01, **P < 0.05, *P < 0.1.
Table 5
Alternative measures of managerial ability.

Panel A: Alternative measure of CEO ability using CEO compensation.

| Variables          | Investment policies | Financing policies | Dividend policy | Cash holdings policy | Firm performance |
|--------------------|---------------------|--------------------|-----------------|----------------------|------------------|
|                    | (1)                | (2)                | (3)             | (4)                  | (5)              |
|                    | M&A                | Investment        | Short-debt leverage | Long-debt leverage | Dividend         |
| CEO compensation   | 0.0029             | -0.0001           | -0.0105***      | -0.0057***          | 0.000***         |
|                    | (0.0036)           | (0.0002)          | (0.0015)        | (0.0005)            | (0.000)          |
| Control variables  | Included           | Included           | Included        | Included             | Included         |
| Industry           | Yes                | Yes                | Yes             | Yes                  | Yes              |
| Time               | Yes                | Yes                | Yes             | Yes                  | Yes              |
| R²                 | 0.016              | 0.009              | 0.212           | 0.237                | 0.150            |
| Observations       | 11,016             | 10,818             | 11,016          | 11,016               | 9639             |

Panel B: Alternative measure of managerial ability using Historical ROA

| Variables          | Investment policies | Financing policies | Dividend policy | Cash holdings policy | Firm performance |
|--------------------|---------------------|--------------------|-----------------|----------------------|------------------|
|                    | (1)                | (2)                | (3)             | (4)                  | (5)              |
|                    | M&A                | Investment        | Short-debt leverage | Long-debt leverage | Dividend         |
| Historical ROA     | -0.0062            | 0.0000             | -0.146***       | -0.0567***          | 0.0006***        |
|                    | (0.0085)           | (0.0006)           | (0.0033)        | (0.0012)            | (0.0001)         |
| Control variables  | Included           | Included           | Included        | Included             | Included         |
| Industry           | Yes                | Yes                | Yes             | Yes                  | Yes              |
| Time               | Yes                | Yes                | Yes             | Yes                  | Yes              |
| R²                 | 0.016              | 0.009              | 0.209           | 0.231                | 0.150            |
| Observations       | 11,016             | 10,818             | 11,016          | 11,016               | 9639             |

Panel C: Alternative measure of managerial ability using Historical Returns

| Variables          | Investment policies | Financing policies | Dividend policy | Cash holdings policy | Firm performance |
|--------------------|---------------------|--------------------|-----------------|----------------------|------------------|
|                    | (1)                | (2)                | (3)             | (4)                  | (5)              |
|                    | M&A                | Investment        | Short-debt leverage | Long-debt leverage | Dividend         |
| Historical Returns | -0.0503***         | 0.0000             | -0.0200***      | -0.00830***         | 0.000370         |
|                    | (0.0118)           | (0.000835)        | (0.00503)       | (0.00193)           | (0.000137)       |
| Control variables  | Included           | Included           | Included        | Included             | Included         |
| Industry           | Yes                | Yes                | Yes             | Yes                  | Yes              |
| Time               | Yes                | Yes                | Yes             | Yes                  | Yes              |
| R²                 | 0.016              | 0.009              | 0.327           | 0.347                | 0.151            |
| Observations       | 11,016             | 10,818             | 11,016          | 11,016               | 9639             |
4.4. Main findings

In this section, we present the findings regarding the effects of managerial ability on corporate decisions and performance. The main findings are reported in Table 4. We estimated our models via pooled OLS. Columns (1) and (2) report the results for the relationship between managerial ability and investment decisions. The results indicate a significant negative effect of managerial ability on Investment ($\beta = -0.155, p < 1\%$). However, there is an insignificant (although negative coefficient) effect of managerial ability on M&A ($\beta = -0.188, p > 10\%$). The results in column (2) are also of economic significance, indicating that one standard deviation increase in managerial ability will decrease Investment (capital assets) by approximately 29.86% $\left[= \frac{0.155 \times 0.131}{0.068}\right]$ in terms of standard deviation. There are several possible explanations of why managerial ability has a significant effect on investment in capital assets, whereas insignificant on M&A. One possible reason can be the fact that firms tend to adjust their investments during the COVID-19 crisis. We assume that higher ability managers show greater aggressiveness in reducing their capital expenditures than in reducing their M&A expenditures. Therefore, M&A may be substituted with capital investment during the COVID-19 crisis. Flammer and Ioannou (2021) argue that firms have significantly reduced their capital expenditure during the COVID-19 crisis compared to their investment in R&D and CSR.

Results regarding the relationship of managerial ability with financing decisions of firms during the COVID-19 crisis are reported in Columns (3) and (4) of Table 4. We document significant negative effects of managerial ability on short-debt leverage ($\beta = -0.371, p < 1\%$) and long-debt leverage ($\beta = -0.600, p < 1\%$). The findings suggest that more capable managers have decreased financing in both short-term debt and long-term debt. These results are also economically significant, indicating that one standard deviation increase in managerial ability will decrease short-debt leverage by 10.4% $\left[= \frac{0.371 \times 0.131}{0.465}\right]$ and long-debt leverage by 43.4% $\left[= \frac{(0.600 - 0.131)}{0.181}\right]$ in terms of standard deviation. These results support our assumptions that firms with higher ability managers have lower leverage ratios during the COVID-19 pandemic given the high associated costs and the challenges in raising external funds. In addition, firms led by higher ability managers have the propensity to use internal funds for financing, because such firms are likely to achieve higher performance which can be used for financing. Choo et al. (2021) argue that high ability managers tend to reduce loan financing and prefer equity financing, especially in well-governed and financially unconstrained firms.

Column (5) of Table 4 presents the results regarding the relationship of managerial ability with the dividend policy of firms during the COVID-19 crisis. Despite having a positive coefficient, managerial ability has an insignificant effect on dividend payouts ($\beta = 0.004, p > 10\%$). Although, we find an insignificant association between managerial ability and dividends payout; however, in our additional analysis, we document a statistically significant relationship between these two when alternative proxies of managerial ability and dividend payouts are taken into consideration. Hence, the results provide support for our hypothesis that higher ability managers, given their confidence in their skills to maintain the profitability of their firms, are not concerned about paying dividends or reducing these dividends at a later period. Considering that firms with more able managers are likely to achieve higher performance during uncertain times, the propensity to pay dividend payouts increases. In this case, during the COVID-19 crisis, firms with higher ability managers are likely to pay greater dividends compared with firms having lower ability managers.

Results regarding the relationship between managerial ability and cash holdings are reported in Column (6) of Table 4. We find a significant negative effect of managerial ability on cash holdings ($\beta = -0.213, p < 10\%$). We also observed that this result is economically significant, indicating that one standard deviation increase in managerial ability will lead to a decrease of 8.01% $\left[= \frac{(0.213 \times 0.131)}{0.348}\right]$ in terms of standard deviation in cash holdings. These findings suggest that firms with higher ability managers have a lower propensity to hold cash reserves during the COVID-19 crisis compared with firms having lower ability managers. The findings contradict the precautionary view, which holds that firms are inclined to hoard more cash at times of a crisis. These results support the alternative view that having higher ability managers will drive firms to reduce their cash holdings because these managers are able to make effective decisions that can improve the performance of their firms, reduce their financial constraints, and eventually discourage them from holding cash even when facing a crisis.

Finally, columns (7) and (8) report the results regarding the relationship of managerial ability with firm performance. Our findings illustrate significant positive effects of managerial ability on ROA ($\beta = 0.024, p < 1\%$) and ROE ($\beta = 0.052, p < 1\%$). These findings suggest that firms with high ability managers have a greater tendency to demonstrate performance improvements during the COVID-19 crisis. Moreover, the results are also of economic significance, suggesting that one standard deviation increase in managerial ability will increase ROA by approximately 15.72% $\left[= \frac{(0.024 \times 0.131)}{0.020}\right]$ and ROE by about 14.81% $\left[= \frac{(0.052 \times 0.131)}{0.046}\right]$ in terms of standard deviation. These results support the contention that those firms with higher ability managers tend to outperform those with low ability managers during the pandemic given the unique skills, abilities, and knowledge of these managers that help them formulate effective decisions. These findings also corroborate those of previous researchers who argue that having higher ability managers can help firms demonstrate performance improvements at times of uncertainty (e.g., Andreou et al., 2017; Gong et al., 2020).

4.5. Robustness checks and additional analysis

4.5.1. Alternative measures of managerial ability

We check the robustness of our results by using additional measures of managerial ability. Table 5 presents the results for these
alternative measures. Only the results for the main variables are reported here for brevity. It is evident from the literature that one of the important positions in a firm is the CEO that plays a prominent role in determining corporate decisions. Given that our adopted managerial ability measure captures the ability of not just the CEO but all managers, we need to investigate how the ability of the CEO affects the corporate decisions and outcomes during the COVID-19 crisis. In reference to previous studies (e.g., Chang et al., 2010; Demerjian et al., 2012), we measure the CEO’s ability considering his/her Compensation (natural log of total compensation). It is evident from the literature that higher ability CEOs have a stronger propensity to receive higher compensation, compared to incompetent CEOs (Custódio and Metzger, 2014).

Panel A of Table 5 presents the results. We document significantly negative effects of CEO ability on Short-debt leverage and Long-debt leverage, whereas significantly positive on CASH, Dividend, and ROA. Although CEO ability has insignificant effects on ROE and Investment, the related coefficients take the same signs as those captured by our main measure of managerial ability.

Second, we used past five-years industry-adjusted return on assets (Historical ROA), which has also been used as a proxy of managerial ability by several studies in the literature (e.g., De Franco et al., 2017; Demerjian et al., 2012; Rajgopal et al., 2006; Sun, 2017). Panel B of Table 5 presents the results, which highlight significant negative coefficients of both Short-debt leverage and Long-debt leverage, whereas significant positive coefficients of ROA and Dividends. However, managerial ability shows insignificant negative effects on cash holdings and investment.

Finally, we used past five-year historical industry-adjusted stock returns (Historical Returns) as a measure of managerial ability following prior studies (e.g., Demerjian et al., 2012; Fee and Hadlock, 2003). Panel C of Table 5 presents the results, which highlight the significantly negative coefficients of Cash, M&A, and Short-debt leverage, Long-debt leverage, the significantly positive coefficients of ROE and ROA, and the insignificant coefficients of Dividend and Investment.

### Table 6

Robustness check using alternative proxies.

| Variables | Capital expenditure | Market leverage | Dividend payout | Cash holdings | Earnings per share |
|-----------|---------------------|-----------------|-----------------|---------------|-------------------|
| Managerial ability | −0.0199*** (0.0049) | −0.180*** (0.0478) | 0.0093* (0.005) | −0.579* (0.315) | 1.061*** (0.219) |
| Duality | 0.0014*** (0.0003) | −0.004440 (0.0004) | 0.0007* (0.0004) | 0.0532*** (0.0196) | 0.0449*** (0.0137) |
| Board | −0.0000 (0.0001) | −0.0012 (0.0001) | 0.0002 (0.0001) | 0.0114 (0.0077) | −0.0179*** (0.0054) |
| Independence | 0.0002 (0.0003) | 0.005 (0.0003) | −0.0008* (0.0004) | −0.0452* (0.0241) | 0.0322* (0.0168) |
| Institutional | 0.0012* (0.0006) | −0.0664*** (0.0008) | −0.0028*** (0.0008) | 0.329*** (0.0415) | 0.0730** (0.0290) |
| State | −0.0024*** (0.0003) | 0.0252*** (0.0035) | 0.00096*** (0.0003) | 0.175*** (0.0229) | −0.0454*** (0.0160) |
| Size | 0.0004 (0.0003) | 0.0988*** (0.0036) | 0.0025*** (0.0004) | 0.0116 (0.0242) | 0.0371** (0.0169) |
| Growth | 0.0018*** (0.0004) | 0.0125*** (0.0039) | −0.0006 (0.0004) | 0.0724*** (0.0261) | 0.145*** (0.0176) |
| Cash flow | 0.023*** (0.0022) | −0.275*** (0.0216) | −0.011 (0.0026) | 2.195*** (0.143) | 1.592*** (0.0959) |
| MTB | −0.0000 (0.0001) | −0.0375*** (0.0012) | −0.0008*** (0.0001) | 0.0275*** (0.0081) | 0.0649*** (0.0057) |
| Profitability | 0.0106*** (0.0013) | −0.424*** (0.0123) | 0.0098*** (0.0016) | 0.834*** (0.0074) | 0.108*** (0.009) |
| Leverage | 0.0014*** (0.0008) | 0.0140*** (0.0009) | −1.087*** (0.0520) | −0.365*** (0.0338) | 0.156 |
| Industry | Yes | Yes | Yes | Yes | Yes |
| Time | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.0007 (0.0068) | −1.760*** (0.0651) | −0.0631*** (0.0075) | −0.491 (0.435) | −1.286*** (0.304) |
| R² | 0.132 | 0.641 | 0.326 | 0.190 | 0.156 |
| Observations | 11,016 | 11,016 | 9097 | 11,016 | 11,016 |

Notes. This table reports the results using alternative proxies of dependent variables. Variables definitions are located in Appendix A. Standard errors in parenthesis.

*** P < 0.01, ** P < 0.05, *P < 0.1.

5 Results for the control variables are available in online supplementary files.
6 This measure is based on year 2019, and we used the data for the last 5 years to measure this variable.
7 This measure is based on year 2019, and we used the data for the last 5 years to measure this variable.
Although the coefficients are not significant in some cases, the results generated by the above alternative managerial ability measures consistently support our main measure probably because these proxies are not perfectly able to capture managerial ability. In this case, we based our main arguments on the measure developed by Demerjian et al. (2012), which is considered in the literature as the most efficient and reliable measure of managerial ability.

4.5.2. Alternative proxies

We used alternative proxies of corporate policies and performance to test the robustness of our results. First, following the literature (e.g., Bernile et al., 2018; Duchin et al., 2010), we measured investment as ratio of capital expenditures (purchase of fixed assets and other long-term assets) to total assets. Second, following Duong et al. (2021), we used market leverage as total liabilities divided by the sum of total liabilities and the market value of equity. Third, following John et al. (2011), we measured dividend payout as cash dividends on common stock scaled by the market value of common equity. Fourth, following Itzkowitz (2013), we computed cash holdings as the logarithm of one plus the ratio of cash and cash equivalents to net assets (where net assets equal total assets minus cash and cash equivalents). Finally, we measured firm performance using earnings per share measured as net income scaled by total shares (e.g., Mashayekhi and Bazaz, 2008).

Table 6 presents the results, which point toward the significantly negative effect of managerial ability on capital expenditure (investment), market leverage (financing), and cash holdings, and its significantly positive effect on dividend payout and earnings per share (performance). In sum, considering alternative proxies of dependent variables does not change our main results.

4.5.3. Types of managerial ability

Given that our main measure broadly captures managerial ability, we cannot easily determine the most important ability for firms during the COVID-19 crisis. According to Custódio and Metzger (2014), the skills of CEOs can be categorized into general and special skills, of which the former include the past experiences of CEOs who previously worked in various types of firms, positions, and industries, whereas the latter includes the experiences gained by the CEO during his/her tenure in his/her present firm. Custódio and Metzger (2014) find that general skills are more valued than special skills, this is one of the main reasons that they are highly paid compared with the latter. Further, Andreou et al. (2017) find that a CEO’s general ability is relatively more important during a crisis compared with their special skills.

Based on the above discussions, we further explore how the policies and outcomes of firms during the COVID-19 pandemic are affected by the general and special ability skills of the CEO. Given their influential position in making corporate decisions, we specifically focused on the ability of CEOs (Andreou et al., 2017; Demerjian et al., 2012). Custódio and Metzger (2014) provide a comprehensive measure of general skills considering five aspects of CEO’s professional career that include: (1) past number of positions; (2) past experiences in different industries in which s/he previously worked; (3) number of past firms; (4) whether s/he worked in a conglomerate; and (5) past experience as a CEO in another company. The CSMAR database provides data for only three of these aspects, namely, number of positions held in the past, past work experience in a conglomerate, and number of previous employers. In line with Custódio and Metzger (2014), we constructed a general CEO ability index by using principal component analysis. This index is a linear combination of the three aforementioned proxies, with more weight assigned to those proxies that reflect the general skills of CEOs more accurately. Finally, we classify Generalist CEOs as those for whom the general ability index is above the sample median, and classify others as Specialist CEOs.

Table 7 presents the results of the additional analysis. Columns (1)–(8) report the results for generalist CEOs, whereas, columns (9)–(16) for specialist CEOs. The results provide evidence that generalist CEOs negatively influence Investment, Short-debt leverage, Long-debt leverage, whereas positively influence ROA and ROE. Further, we document that specialist CEOs positively influence M&A and Cash. These notable findings highlight significant variations in the effects of generalist and specialist CEOs, with generalist CEOs positively affecting M&A and cash holdings yet insignificantly affecting firm performance. The results for generalist CEOs are similar (in terms of coefficient signs) to our main measure of managerial ability, hence suggesting that the general skills of CEOs are relatively more important than their special skills in improving the performance of firms especially at times of uncertainty. These results support the arguments of Custódio and Metzger (2014) and Andreou et al. (2017), who both show that general skills of the managers are more important than their special skills.

4.5.4. Subsample analysis using SOEs and non-SOEs

In China, majority of the firms are controlled by the government, which are known as state-owned enterprises (SOEs). We argue that the influence of managerial ability on corporate policies and outcomes can vary across SOEs and non-SOEs. There are several reasons for conducting this additional analysis. First, while the COVID-19 pandemic has adverse effects on all types of firms, SOEs endured a relatively less severe impact from the pandemic compared with non-SOEs given that the former can easily obtain resources and funding from the government, such as loans from state-controlled banks (Guariglia and Yang, 2018; Yu, 2013). However, it is difficult for non-SOEs to access government resources (Cheng and Wu, 2019). Studies indicate that firms with government ownership

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8 The CSMAR database provides information on the 10 types of work experiences of CEOs, including in management, production, human resource management, R&D, designing, accounting, marketing, finance, law, and others. We design a variable that takes a value of 1 for CEOs with a specific professional experience and takes a value of greater than 1 for CEOs having multiple backgrounds. Specifically, this variable equals 3 for a CEO with 3 professional experiences. This index therefore has a value range of 1 to 10.

9 The PCA results are available upon request.
# Table 7
Types of managerial ability.

| Variables | Generalist CEOs | Specialist CEOs | Generalist CEOs | Specialist CEOs |
|-----------|-----------------|-----------------|-----------------|-----------------|
|           | Investment policies | Financing policies | Dividend policy | Firm performance | Investment policies | Financing policies | Dividend policy | Cash holding policy | Firm performance |
| (1)       | (2)              | (3)              | (4)             | (5)             | (6)              | (7)              | (8)             | (9)             | (10)            |
| M&A       | 0.002 (0.004)    | 0.000 (0.002)    | 0.000 (0.008)   | 0.001 (0.003)   | 0.072* (0.038)   | 0.001 (0.001)    | 0.000 (0.006)   | 0.000 (0.006)   | 0.026*** (0.008) |
| Investment | 0.000 (0.002)    | 0.000 (0.003)    | 0.000 (0.006)   | 0.000 (0.001)   | 0.000 (0.001)    | 0.000 (0.001)    | 0.000 (0.003)   | 0.000 (0.000)   | 0.000 (0.001)   |
| Short-debt leverage | -0.006*** (0.004) | -0.025*** (0.002) | -0.010*** (0.008) | -0.009 (0.003) | -0.004 (0.006) | -0.000 (0.003) | -0.000 (0.003) | -0.000 (0.000) | -0.000 (0.000)   |
| Long-debt leverage | -0.006*** (0.002) | -0.025*** (0.003) | -0.010*** (0.003) | -0.009 (0.006) | -0.004 (0.006) | -0.000 (0.003) | -0.000 (0.003) | -0.000 (0.000) | -0.000 (0.000)   |
| Dividend | 0.000 (0.000)    | 0.000 (0.000)    | 0.000 (0.006)   | 0.000 (0.001)   | 0.000 (0.001)    | 0.000 (0.001)    | 0.000 (0.003)   | 0.000 (0.000)   | 0.000 (0.000)   |
| Cash ROA | 0.001*** (0.000) | 0.001*** (0.001) | 0.001*** (0.001) | 0.001*** (0.000) | 0.001*** (0.001) | 0.001*** (0.001) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) |
| ROE      | 0.003*** (0.000) | 0.003*** (0.001) | 0.003*** (0.001) | 0.003*** (0.000) | 0.003*** (0.001) | 0.003*** (0.001) | 0.003*** (0.000) | 0.003*** (0.000) | 0.003*** (0.000) |
| Size     | -0.013*** (0.004) | 0.041*** (0.001) | 0.023*** (0.007) | 0.000*** (0.003) | 0.000*** (0.001) | 0.000*** (0.000) | 0.000*** (0.002) | 0.000*** (0.000) | 0.000*** (0.000) |
| Growth   | -0.014 (0.011)   | 0.114*** (0.021) | 0.034*** (0.008) | -0.000 (0.016)  | 0.000*** (0.001) | 0.000*** (0.001) | 0.000*** (0.002) | 0.000*** (0.000) | 0.000*** (0.000) |
| Cash flow | -0.036 (0.057)   | -0.357*** (0.021) | -0.169*** (0.015) | 0.021*** (0.004) | 0.066*** (0.001) | 0.080*** (0.003) | 0.125*** (0.002) | -0.904*** (0.001) | 0.094* (0.004) |
| MTB      | 0.029*** (0.003) | -0.000 (0.001)   | 0.049*** (0.006) | 0.015*** (0.000) | 0.011*** (0.000) | 0.001*** (0.001) | 0.001*** (0.002) | 0.014*** (0.001) | 0.438*** (0.001) |
| Profitability | -0.029 (0.036) | -1.317*** (0.013) | -0.354*** (0.024) | 0.012*** (0.000) | 0.028*** (0.000) | 0.013*** (0.001) | 0.010*** (0.001) | 0.012*** (0.000) | 0.012*** (0.000) |
| Leverage | 0.052** (0.021)  | -0.016** (0.008) | -0.000 (0.013)   | -0.267*** (0.024) | -0.017*** (0.013) | -0.017*** (0.014) | -0.222*** (0.016) | -0.032*** (0.006) | 0.001 (0.001) |
| Industry | 0.189*** (0.098) | -0.056** (0.036) | -0.834*** (0.187) | -0.459*** (0.067) | 0.755*** (0.005) | -0.403*** (0.140) | -0.077*** (0.007) | 0.437*** (0.071) | -0.713*** (0.043) |
| Constant | 0.033 (0.092)   | 0.016 (0.018)    | 0.301 (0.067)    | 0.320 (0.005)    | 0.155 (0.140)    | 0.275 (0.007)    | 0.154 (0.071)    | 0.029 (0.007)    | 0.249 (0.082)    |
| Observations | 5630 (5630) | 5541 (5630)    | 5630 (5630)    | 5630 (5630)    | 5244 (5135)    | 5244 (5135)    | 5244 (5135)    | 5244 (5135)    | 5244 (5135)    |

Notes. This table reports the results considering the generalist and specialist ability of the CEOs. Variables definitions are located in Appendix A. Standard errors in parenthesis.

* **P < 0.01, ** P < 0.05, * P < 0.1
Table 8
Subsample analysis using state-owned and non-state-owned firms.

| Variables          | M&A      | Investment | Short-debt leverage | Long-debt leverage | Dividend | Cash holding | ROA | ROE | M&A      | Investment | Short-debt leverage | Long-debt leverage | Dividend | Cash holding | ROA | ROE |
|--------------------|----------|------------|---------------------|--------------------|----------|--------------|-----|-----|----------|------------|---------------------|---------------------|----------|--------------|-----|-----|
| Managerial ability | 0.049    | -0.226***  | 0.078               | -0.425***          | -0.001   | -0.076       | -0.004 | 0.033** | -0.973   | -0.085***  | -1.036***          | -0.987***          | 0.16**   | -0.678***    | 0.069** | 0.082*** |
| Duality            | -0.010   | 0.003      | -0.009              | -0.005             | 0.001    | 0.027**      | 0.002 | 0.003 | -0.041   | 0.002**    | -0.017              | -0.003             | -0.000   | 0.008        | 0.001** | 0.001     |
| Board              | 0.002    | -0.001     | 0.001               | 0.002              | 0.000    | 0.001        | 0.000   | 0.000 | -0.018   | 0.000      | 0.004              | 0.033             | 0.000   | 0.006        | -0.000 | -0.000    |
| Institutional      | -0.013   | 0.001      | -0.180***           | -0.038***          | 0.002    | 0.157***     | 0.006   | 0.133** | 0.003   | 0.018***   | 0.000              | 0.033             | 0.000   | 0.006        | 0.001** | 0.001     |
| Size               | -0.011   | 0.021**    | 0.039***            | 0.066***           | 0.001**  | 0.001        | 0.000   | 0.000 | 0.032   | 0.001      | 0.015***          | -0.091***          | 0.016   | -0.002***    | -0.002 | -0.002    |
| Growth             | -0.016   | 0.010      | 0.041***            | 0.029***           | -0.001   | -0.016       | 0.002*** | 0.055** | 0.001   | 0.020***   | 0.007              | 0.015***          | 0.001   | 0.016        | 0.001 | 0.002    |
| Cash flow          | 0.020    | 0.062***   | -0.005              | -0.054***          | 0.009*** | 0.264***     | 0.052   | 0.103*** | 0.001   | -0.210***  | -0.124***          | 0.022***          | 0.063*** | 0.085***    | 0.130*** |
| MTB                | 0.026*** | -0.001     | -0.006              | 0.002              | 0.001*** | 0.038***     | 0.003   | 0.055** | 0.001*** | 0.001      | 0.001***          | 0.001***          | 0.001   | 0.004        | 0.000 | 0.000    |
| Profitability      | -0.026   | 0.016      | -0.530***           | -0.331***          | 0.014*** | -0.078       | -0.051 | 0.016*** | -1.105*** | -0.234***  | 0.010***          | 0.129***          | 0.001   | 0.041        | 0.001 | 0.041    |
| Leverage           | 0.032    | -0.037***  | 0.003**             | -0.159**           | -0.010*** | 0.025***     | -0.139** | 0.000 | -0.001   | -0.034***  | -0.100***          | -0.020***          | 0.018*** | 0.001        | 0.001 | 0.003    |
| Industry           | Yes      | Yes        | Yes                 | Yes                | Yes      | Yes          | Yes    | Yes   | Yes      | Yes        | Yes                 | Yes               | Yes     | Yes          | Yes    |
| Constant           | 0.146    | -0.361***  | -0.440***           | -1.197***          | -0.020*** | 0.236        | -0.053*** | -0.042 | -0.487   | -0.090***  | -2.043***          | -1.559***          | 0.011   | 0.308        | 0.027* | -0.010  |
| R²                 | 0.021    | 0.021      | 0.385               | 0.470              | 0.153    | 0.193        | 0.304   | 0.190 | 0.023    | 0.025      | 0.249              | 0.243             | 0.170   | 0.102        | 0.286  | 0.155   |
| Observations       | 3276     | 3260       | 3276                | 3276              | 3276     | 3276         | 7740   | 7740  | 6681     | 7740       | 7740                | 7740              | 7740    | 7740        | 7740   | 7740    |

Notes. This table reports the results by dividing the sample into state-owned and non-state-owned firms. Columns (1) to (8) reports the results for state-controlled firms, whereas columns (9) to (16) reports the results for sample of non-state-owned firms. Variables definitions are located in Appendix A. Standard errors in parenthesis.

*** P < 0.01, ** P < 0.05, * P < 0.1.
achieved higher performance during the global financial crisis (e.g., Beuselinck et al., 2017; Lee et al., 2017; Liu et al., 2012). According to Liu et al. (2012), SOEs in China received more bank loans from the government during the financial crisis compared with non-SOEs after implementing an economic stimulus package. In sum, given their easy access to government resources, SOEs are likely to suffer less from the effects of the COVID-19 pandemic compared with non-SOEs.

Second, we assume that managers play a less influential role in determining corporate decisions in SOEs since they are controlled by the government. Because the main aims of SOEs are to achieve social and political objectives, their decisions are primarily shaped by the government but less by the management (Lin et al., 2020). However, in non-SOEs, managers enjoy greater discretion over the use of the firm’s assets in the absence of other stakeholders, such as the government (Xu et al., 2021). Based on the aforementioned discussion, we expect that the effect of managerial ability can vary across SOEs and non-SOEs. Some of the studies also support this prediction. For example, Wang et al. (2017) argue that managerial ability has a more prevalent effect on alleviating fraud in non-SOEs than in SOEs.

We divided our sample of firms into SOEs and non-SOEs following the classification provided by the CSMAR database. Table 8 reports the results. In line with our expectations, managerial ability demonstrates a significant effect on the decisions of non-SOEs versus SOEs across all cases, except M&A. For SOEs, the effects of managerial ability are only significant in the cases of ROA, Long-debt leverage, and Investment. By contrast, the results for non-SOEs remain consistent with our main findings. These results confirm our prediction that managerial ability has a more pronounced effect among non-SOEs than SOEs.

5. Discussion and conclusions

The current COVID-19 pandemic has induced an economic crisis, which is more severe than the global financial crisis. Accordingly, corporate managers and policymakers have been forced to formulate new strategies to ensure the survival of their operations during the pandemic. How do firms adapt to such extreme events? To answer this question, we investigated how the decisions and outcomes of firms during the pandemic are affected by managerial ability by taking four key corporate decisions into account, namely, investment, financing, dividends, and cash holdings and by also investigating whether firm performance is affected by the managerial ability.

Results highlight managerial ability as a critical determinant of the policies and performance of firms during the COVID-19 crisis. A high degree of managerial ability has a significantly negative effect on the investments of firms as reflected in their capital expenditure and an insignificant influence on their M&A investments. Having higher ability managers also reduces the short-debt and long-debt financing of firms, and these managers have reduced their cash holdings in response to the crisis. Firms led by higher ability managers also have a greater propensity to pay dividend during the pandemic compared to firms led by less able managers. Those firms with higher ability managers also outperform other firms during the pandemic. We also classified CEOs into generalist and specialist CEOs based on their abilities and found that the former has a greater influence on the policies and performance of firms compared with the latter. We performed additional analyses and found that managerial ability has significantly varying effects on SOEs and non-SOEs. These results highlight managerial ability as a key factor that affects the decisions and outcomes of a firm during a crisis.

5.1. Implications

Our findings offer several implications. First, these findings can guide the responses of firms to the COVID-19 crisis. Our results highlight the critical role of managerial ability at times of uncertainty. Since, the COVID-19 pandemic has induced an economic uncertainty, therefore, policymakers should formulate strategies to effectively respond to the COVID-19 pandemic. Our analyses indicate that managerial ability is a significantly important determinant of the firm’s policies. Especially, our findings suggest that firms led by higher ability managers have outperformed all other firms during the COVID-19 crisis. Hence, firms should acknowledge the importance of managerial characteristics, including managerial ability, which may play a critical role during a crisis.

Second, the findings provide implications for shareholders related to the hiring of the top management team (TMT). As our analyses indicate that firms with higher ability managers tend to pay more dividends and have a stronger propensity to achieve higher performance, therefore, shareholders should acknowledge the importance of managerial ability at times of a crisis. Our findings also elaborate the contentions of previous researchers who argue that higher ability managers tend to outperform other managers during a period of uncertainty (Andreou et al., 2017; Chen and Lin, 2018). Therefore, shareholders should consider higher ability managers when hiring TMTs. In addition, it is also important to note that certain aspects of managerial ability (e.g., general skills are more important than special skills) are particularly effective in improving the performance of firms during a crisis. For instance, results show that firms headed by generalist CEOs outperform those headed by specialist CEOs. In this case, shareholders should also consider the general professional experiences when hiring CEOs.

Third, we find that managerial ability has varying effects on SOEs and non-SOEs. Chinese firms are unique in the sense that the majority of them are controlled by the state. Our findings show that managerial ability is more influential in determining the decisions...
of non-SOEs compared to SOEs. Therefore, policymakers should examine how the efficiency of SOEs at times of a crisis can be improved. For non-SOEs, higher ability managers play critical roles in the formulation of organizational policies and in driving firm performance during the COVID-19 crisis.

Finally, although our investigation focused on the behavior of firms during the COVID-19 pandemic, our results also provide implications for firms that are facing other events involving high uncertainty and/or economic shocks (i.e., crisis). Hence, it is important to understand that managerial ability is an important factor that affects the outcomes and policies of firms. Given that firm performance is particularly critical at times of a crisis, managerial ability reduces the adverse effects of such events on firms by improving their performance.

**Author statement**

The authors have contributed equally in preparing the manuscript.

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**Appendix A**

**Table A1**

Variables definitions.

| Variables       | Definitions                                                                                                                                 |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| **Dependent variables**                                                                                                                      |
| Investments     | Change in fixed assets plus depreciation scaled by total assets.                                                                             |
| M&A             | Total expenditures in mergers and acquisitions divided by total assets.                                                                        |
| Short-debt      |                                                                                                                                              |
| leverage        | Short-term debt divided by total assets.                                                                                                      |
| Long-term       |                                                                                                                                              |
| leverage        | Long-term debt divided by total assets.                                                                                                       |
| ROA             | Earnings before interest and taxes divided by total assets.                                                                                   |
| ROE             | Earnings before interest and taxed divided by total shareholders’ equity.                                                                     |
| Cash            | Cash and cash equivalents divided by net assets. Net assets are calculated as total assets minus cash and cash equivalents.                   |
| Dividend        | Cash dividends divided by total assets.                                                                                                       |
| **Independent variables**                                                                                                                    |
| Managerial ability | It is residual efficiency resulting from a Tobit regression following Demerjian et al. (2012) that regresses firm efficiency score on a set of industry and firm-specific variables. |
| **Control variables**                                                                                                                        |
| Institutional   | Proportion of shares held by institutional investors.                                                                                          |
| Board           | Total number of directors on board.                                                                                                           |
| Duality         | A variable, set to 1 if the CEO and Chairman of the board are the same and 0 otherwise.                                                        |
| Independence    | Number of independent directors on board.                                                                                                     |
| State           | A dummy variable set to 1 if the firm is state-controlled, otherwise 0.                                                                        |
| Size            | The natural logarithm of total assets.                                                                                                         |
| Growth          | Change in the sales. Change in the operating revenue. Current year sales minus previous year sales divided by previous year sales.            |
| Cash flow       | Operating cash flows divided by total assets.                                                                                                  |
| Profitability   | Earnings before interest and taxed divided by total assets.                                                                                   |
| Leverage        | Total debt divided by total assets.                                                                                                           |
| MTB             | Market value of equity divided by book value of equity.                                                                                       |

Notes. All dependent variables are computed using quarterly data for the year 2020. The independent and control variables are computed using annual data for the year 2019.
## Table A2
Correlation matrix.

|              | Firm efficiency | Managerial ability | Historical ROA | Historical returns | CEO compensation | CEO tenure | CEO media | Size | ROA |
|--------------|-----------------|--------------------|----------------|-------------------|------------------|-----------|-----------|------|-----|
| Firm efficiency | 0.6830          | 0.3398             | 0.1502         | 0.2507            | 0.0103           | 0.0186    | 0.5150    | 0.3573|
| Managerial ability | 0.6511          | 0.1866             | 0.0793         | 0.2614            | −0.0444          | 0.0958    | 0.7313    | 0.1163|
| Historical ROA | 0.0817          | 0.0429             | 0.2173         | 0.2782            | 0.1758           | −0.0467   | 0.1694    | 0.6167|
| Historical Returns | 0.1234          | 0.0395             | 0.1294         | 0.0452            | 0.0536           | 0.0595    | 0.2238    |       |
| CEO Compensation | 0.1905          | 0.0877             | 0.1361         | 0.1286            | 0.1055           | 0.0840    | 0.3630    | 0.2395|
| CEO Tenure     | 0.0011          | −0.0112            | 0.1100         | 0.0434            | 0.1412           | −0.0632   | −0.0387   | 0.1687|
| CEO Media      | 0.0131          | −0.0106            | −0.0860        | 0.0452            | 0.1655           | −0.0883   | 0.1361    | −0.0669|
| Size           | 0.3065          | 0.1007             | 0.0828         | 0.0703            | 0.3343           | −0.0545   | 0.2907    | 0.0675|
| ROA            | 0.0960          | 0.0393             | 0.4254         | 0.0446            | 0.1147           | 0.0569    | −0.0364   | 0.0639|

Notes. This table reports correlation analysis. The upper diagonal reports Spearman correlation coefficients, whereas lower diagonal report Pearson correlation coefficients. Firm efficiency is measured using DEA. Managerial ability is the residuals from Eq. (2). Historical Returns is five-year historical industry adjusted stock returns. Historical ROA is five year industry-adjusted return on assets (income before interest and taxes scaled by total assets). CEO Compensation refers to natural log of CEO compensation. CEO Tenure is natural log of the CEO tenure. CEO Media indicates natural log of CEO media mentions. Size is natural log of total assets. ROA represents income before interest and taxes scaled by total assets. The correlation analysis are carried out using annual data for the year 2019. Bold values indicate significance at the 5% and 10% levels.
Lee, C.-C., Wang, C.-W., Chiu, W.-C., Tien, T.-S., 2018. Managerial ability and corporate investment opportunity. Int. Rev. Financ. Anal. 57, 65–76.
Li, H., 2015. Managerial ability and internal control quality: evidence from China. Int. J. Financ. Res. 6 (2), 54–66.
Lin, K.J., Lu, X., Zhang, J., Zheng, Y., 2020. State-owned enterprises in China: a review of 40 years of research and practice. China J. Account. Res. 13 (1), 31–55.
Lintner, J., 1956. Distribution of incomes of corporations among dividends, retained earnings, and taxes. Am. Econ. Rev. 46 (2), 97–113.
Liu, C., Uchida, K., Yang, Y., 2012. Corporate governance and firm value during the global financial crisis: Evidence from China. Int. Rev. Financ. Anal. 21, 70–80.
Lozano, M.B., Yaman, S., 2020. The European financial crisis and firms’ cash holding policy: an analysis of the precautionary motive. Glob. Pol. 11, 84–94.
Malmendier, U., Tate, G., Yan, J., 2011. Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies. J. Financ. 66 (5), 1667–1733.
Mashayekhi, B., Bazaz, M.S., 2008. Corporate governance and firm performance in Iran. J. Contemp. Account. Econ. 4 (2), 156–172.
Park, S.Y., Song, Y., 2019. The effect of managerial ability on a firm’s dividend policy: evidence from Korea. Int. J. Entrepr. 23 (1), 1–15.
Phan, D.H.B., Narayan, P.K., 2020. Country responses and the reaction of the stock market to COVID-19—A preliminary exposition. Emerg. Mark. Financ. Trade 56 (10), 2138–2150.
Puwanenthiren, P., Dang, M., Henry, D., Puwanenthiren, P., Al Mamun, M., 2019. Does managerial ability matter for the choice of seasoned equity offerings? North Am. J. Econ. Finance 47, 442–460.
Rajgopal, S., Shevlin, T., Zamora, V., 2006. CEOs’ outside employment opportunities and the lack of relative performance evaluation in compensation contracts. J. Financ. 61 (4), 1813–1844.
Silva, A.C., 2010. Managerial ability and capital flows. J. Dev. Econ. 93 (1), 126–136.
Sun, L., 2017. Managerial ability and chemical releases. Sustain. Account. Manag. Pol. J. 8 (3), 281–306.
Tran, Q.T., 2021. Economic policy uncertainty and cost of debt financing: International evidence. North Am. J. Econ. Finance 57, 101419.
Wang, Z., Chen, M.H., Chin, C.L., Zheng, Q., 2017. Managerial ability, political connections, and fraudulent financial reporting in China. J. Account. Public Policy 36 (2), 141–162.
Xu, X., Wang, F., Chen, X., Yang, G., 2021. Does managerial ability matter for cross-border M&As: evidence from Chinese listed firms. J. Asian Econ. 74, 101302.
Yu, M., 2013. State ownership and firm performance: Empirical evidence from Chinese listed companies. China J. Account. Res. 6 (2), 75–87.
Yuan, Y., Tian, G., Lu, L.Y., Yu, Y., 2019. CEO ability and corporate social responsibility. J. Bus. Ethics 157 (2), 391–411.
Zaremba, A., Kirzy, R., Aharon, D.Y., Demir, E., 2020. Infected markets: novel coronavirus, government interventions, and stock return volatility around the globe. Financ. Res. Lett. 101597.
Zhang, L., 2017. CEOs’ early-life experiences and corporate policy: evidence from China’s great famine. Pac. Basin Financ. J. 46, 57–77.
Zhang, G., Han, J., Pan, Z., Huang, H., 2015. Economic policy uncertainty and capital structure choice: evidence from China. Econ. Syst. 39 (3), 439–457.
Zhang, D., Hu, M., Ji, Q., 2020. Financial markets under the global pandemic of COVID-19. Financ. Res. Lett. 36, 101528.
Zhao, Q., Gao, J., Wang, S., 2016. Literature review on the relationship between managerial ability and real earnings management. In: Paper presented at the 13th International Conference on Service Systems and Service Management (ICSSSM).

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