Full length article

Leadership in a pandemic: Do more able managers keep firms out of trouble?☆

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ABSTRACT

The Coronavirus crisis has led to unprecedented economic shocks to the corporate world and challenged how corporate management contributes to business resilience amid the pandemic. Employing a novel measure of managerial ability constructed for a large sample of U.S. publicly listed firms, we document that firms led by higher managerial ability exhibit lower stock return volatility, higher operating performance, and lower levels of default risk amid the pandemic. A difference-in-differences analysis suggests that the impact of managerial ability on firm performance is stronger during the pandemic than during the pre-pandemic period. The effect of managerial competency on corporate resiliency is more pronounced among firms that have high exposure to COVID-19. In addition, firms led by high managerial competency management are associated with higher stock liquidity and are less likely to exhibit employment, healthcare, safety, and consumer protection related violations amid the pandemic.

"The ultimate measure of a man is not where he stands in moments of comfort and convenience, but where he stands at times of challenge and controversy."

[Martin Luther King, American Christian minister and activist.]

1. Introduction

The onset of the COVID-19 pandemic and the outbreak of the infectious disease have brought about unprecedented disruptions to the economy and capital markets (Baker et al., 2020).[1] From its peak on February 19th, 2020, the S&P 500 index had lost 34% by March 23rd while the CBOE implied volatility index had reached a 10-year high of 83%. In the wake of this pandemic-induced carnage, academic research has quickly uncovered how certain qualities of firms can serve as effective shields in sparing firms from the overwhelming value destruction (e.g., (Acharya and Steffen, 2020; Ramelli and Wagner, 2020; Ding et al., 2021; Albuquerque et al., 2020)). While extant research has focused

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[1] As of December 2020, more than 17 million people across 50 states in the U.S. have been infected with the coronavirus, more than 300,000 people have died, and tens of thousands of newly infected cases are reported daily. The scale of the COVID-19 shock is also unprecedented across the globe. The pandemic has infected more than 74 million people and claimed more than 1.6 million lives around the globe (WHO, 2020; available at: https://covid19.who.int/).

extensively on firm fundamentals, the role of management in steering their firms during the crisis has been largely unexplored. In this study, we examine whether managerial ability is associated with a more resilient corporate performance during the pandemic period.

The relation between managerial ability and firm operations in times of uncertainty remains unclear as the literature provides mixed implications. On the one hand, one strand of literature promotes the values of managerial ability in firm operations. For example, studies have shown that managers with high ability place a positive effect on firm valuation (Hayes and Schaefer, 1999; Demerjian et al., 2012), improve firm performance (Bertrand and Schoar, 2003), and prepare high-quality financial reports (Demerjian et al., 2013). Given these findings, one may expect that able managers can play significant roles in their firms' outcomes in times of crisis. On the other hand, the argument of neoclassical economic theory suggests that firm fundamentals chiefly drive corporate outcomes while managers and fundamentals are merely homogeneous substitutes. Concerning the COVID-19 pandemic, given the sheer scale of the pandemic-induced devastation to the economy (Baker et al., 2020) and the expected increased correlations in crisis periods (Campbell et al., 2002), firm performance can be largely driven in a systematic way so that differences in managerial ability may no longer play an important role. In addition, the COVID-19 pandemic is not similar to any shock that happened before. Given a massive spike in uncertainty as induced by the pandemic, managers might not insert important roles in this rare event (considered as a one-in-100-year shock without precedent in US history, as suggested by Altig et al. (2020) and Goldstein et al. (2021). Furthermore, if high managerial ability firms are already managing it efficiently, there might be less slack to absorb during times of crisis. Given the mixed implications from the prior literature, the impacts of managerial ability on corporate outcomes during the pandemic cannot immediately be inferred from extant literature and hence this void urges a comprehensive empirical investigation.

Quantifying managerial ability (MA) has posed an empirical challenge for early studies (e.g., (Harris and Holmstrom, 1982; Rosen, 1982; Trueman, 1986; Hayes and Schaefer, 1999; Berk and Stanton, 2007)). We, therefore, exploit recent advances in management science literature which utilize the data envelopment analysis (DEA) and disentangle managerial performance from firm-specific resources. Specifically, we employ the managerial ability measure which Demerjian et al. (2012, p. 1229) define as "managers' efficiency, relative to their industry peers, in transforming corporate resources to revenues".

Corporate resilience is a multi-dimensional concept and hence cannot be captured by a single metric. We, therefore, consider several corporate outcomes as proxies for corporate resilience at the onset of the pandemic. First, we examine firm risk during the pandemic, as measured by the volatility of stock returns, as it directly affects shareholders' wealth and is an important factor for corporate valuation (e.g., (Pástor and Pietro, 2003). Second, we consider firm performance as a direct measure of corporate resilience during the pandemic. Third, we consider corporate default to gauge how competent managers contribute to shielding their firms against the adverse impacts of the pandemic. In addition, given stock liquidity is one of the most important features of financial markets (e.g., (Chordia et al., 2008)) and the COVID-19 pandemic has led to a significant reduction in the market liquidity (Foley et al., 2022; Goldstein et al., 2021), we further examine the stock liquidity consequences of the managerial ability.

Using a large dataset of U.S. publicly listed firms over the first two quarters of 2020, we document that firms led by managers with high ability (high MA) exhibit significantly lower stock return volatility during the pandemic. Examining various performance measures, we find that firms with high MA show higher

returns on assets and higher market valuation (Tobin's Q). Most importantly, firms with high MA exhibit significantly lower levels of default risk during the COVID-19 pandemic. These findings are robust to controlling for firm fundamentals or industry norms. We also control for a battery of firm qualities such as corporate social responsibility rating, board quality, analyst coverage, institutional ownership as well as CEO characteristics and document robust findings. In addition, firms led by high managerial competency management are associated with higher stock liquidity and are less likely to exhibit employment, healthcare, safety, and consumer protection-related violations in the first two quarters of 2020 when COVID-19 strikes.

We further examine the mechanisms through which able managers can influence corporate outcomes at the onset of the pandemic as fundamental channels can reduce the likelihood of picking up spurious relations. We document two possible channels underlying the documented relation. First, we find that able managers tend to make less idiosyncratic decisions, leading to less volatile cash flows during the pandemic. Second, firms with more competent managers offer better working conditions for their employees who are the driving forces of corporate performance.

A potential identification challenge in our study is that managerial ability may not be entirely random. For example, albeit our comprehensive list of controls for firm qualities, it is still possible that firms appoint their managers as endogenous choices, rendering it rather difficult to attribute changes in a firm's resilient performance to variation in managerial ability. In addition, given prior research shows managerial ability has important implications for corporate outcomes such as lower levels of cost of debt or higher innovation activities (Bonsall IV et al., 2017; Chen et al., 2015a,b), one could argue that research findings in our study are simple manifestations of the documented role of managerial ability.

We seek to provide more direct identification of the impact of managerial ability on firm performance in our final research inquiry. Specifically, we argue that managerial ability identified for firms before COVID-19 is orthogonal to the pandemic because of the unanticipated nature of COVID-19 and the rapid pace of the outbreak.[2] We then estimate a difference-in-differences regression model to examine whether managerial ability prior to the COVID-19 pandemic places a stronger influence on firm performance during the pandemic than during the pre-COVID-19 period. We document that firms with high managerial ability, when compared to their counterparts with low managerial ability, exhibit significantly higher performance during the COVID-19 pandemic than during the pre-pandemic period. The effect of managerial competency on corporate resilience amid the pandemic is more pronounced among firms that are more exposed to COVID-19. Collectively, our evidence suggests that managerial ability is not only an important factor for firm performance, but its role is also of special significance when firms operate in a crisis period.

Our study offers two important contributions to the literature. First, contemporary research has uncovered several potential explanations for the cross-section in firms' responses to the COVID-19 pandemic. These include policy responses (Baker et al., 2020), liquidity access (Acharya and Steffen, 2020), strong balance

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[2] Prior research often examines chief executive officer (CEO) replacements (when CEOs are replaced with other more (less) able CEOs) to elicit a more direct impact of managerial ability on firm performance (see, for example, Bonsall IV et al., 2017). This approach is not feasible in our setting given only few CEO turnover observations during the first two quarters of 2020 when the pandemic strikes. In addition, the decision to appoint new high (less) able CEOs is still a possible endogenous choice.

sheet (Ding et al., 2021), environmental and social ratings (Albuquerque et al., 2020; Bae et al., 2021; Gillan et al., 2021)), culture (Fernandez-Perez et al., 2021), government responses (Nguyen, Pham, Pham, and (Pham, 2020; Huynh et al., 2021)), and work-from-home adaptability (Bai et al., 2020; Nguyen et al., 2020a,b). Our study shows that managerial ability also places considerable effects on the cross-section of firm performance during the COVID-19 pandemic. These effects are incremental to firm fundamentals. In the search for a 'corporate vaccine' against pandemic-induced adversity, firms should view hiring and retaining high-quality management as of significant real economic benefits.[3]

Second, our study sheds new light on the roles of management's attributes. This strand of literature is growing and at the intersection of multiple disciplines including behavioral finance, economics, accounting, and management. In principle, management styles can explain various corporate policy choices and consequently these styles place significant effects on firm performance (see, for example, (Dyreng et al., 2010; Benmelech and Frydman, 2015; Schoar and Zuo, 2016; Law and Mills, 2017)). Our study contributes to this stream of literature by highlighting that the role of managerial ability as we know it, is of utmost importance in a crisis period. To a large extent, the findings in our study also help validate the measure of the managerial ability of Demerjian et al. (2012). This measure captures the efficiency with which managers transform corporate resources (e.g., capital, labor, intangible assets) into revenues. During the COVID-19 pandemic when resources are low and such adversity is unrelated, the ability to maximize outputs from scarce resources is especially valuable. Our findings have, therefore, important implications for corporate stakeholders and crisis management practices.

The remainder of the paper is organized as follows. Section 2 discusses related literature and empirical predictions. Section 3 describes the sample, data, and variable definitions. Section 4 presents our main empirical results. Section 5 concludes the paper.

2. Related literature and empirical predictions

Sustainable development has attracted increasing attention from academics, practitioners, and policymakers in recent decades. As such, the United Nations has proposed 17 sustainable development goals (SDGs) that aim to spur economic growth, reduce inequality, and promote health and education while tackling sources of global risks (United Nations, 2020). Investors' attention toward sustainability and resilience become even more pronounced during times of crisis such as the global financial crisis (2007–2008) and the recent COVID-19 pandemic (e.g., (Lins et al., 2017; Albuquerque et al., 2020; Ding et al., 2021)). Given the massive pandemic-induced disruptions to the global economy and the expected increased correlations in crisis periods (Baker et al., 2020; Campbell et al., 2002), what firm qualities can serve as effective shields against the adverse impacts of the pandemic are of economic and social importance.

Starting from the seminal work of Bertrand and Schoar (2003), a growing strand of literature has been devoted to examining how managers' attributes explain various corporate behavior and outcomes (see, for example, Malmendier and Tate (2005), Malmendier et al. (2011), Benmelech and Frydman (2015), Bernile et al. (2017), and Cronqvist and Yu (2017). Motivated by this strand of literature, we consider whether, and to what extent,

corporate managers play roles in response to the recent health crisis.

Whether management styles and attributes can place significant impacts on corporate policy choices and outcomes remain a heated debate over the past few decades. Earlier work, such as Thomas (1988), finds little evidence of the impact of top managers on their firms' overall performance. Consistent with this conjecture, the argument of neoclassical economic theory suggests that firm fundamentals chiefly drive corporate outcomes while managers and fundamentals are merely homogeneous substitutes. Subsequent studies, however, provide evidence that management styles can explain several important corporate decisions (see, for example, (Dyreng et al., 2010; Benmelech and Frydman, 2015; Schoar and Zuo, 2016; Pham, 2020; Pham et al., 2022).

Given the existing literature, there are at least two possible predictions regarding the relation between managerial ability and firm operations in times of uncertainty remains. First, one can expect that managerial ability should play a significant role in corporate outcomes in times of crisis. A possible channel underlying this point of view is that high-ability managers can develop strategies and operational effectiveness that help firms better navigate in adverse and unexpected business conditions. In addition, when employees turn to their leaders for guidance and reassurance more than ever in extraordinary times, high ability from management can permeate through their entire organizations via higher trust and confidence. This would translate into a positive relation between managerial ability and firm operations in times of uncertainty, which we name the "managerial competence hypothesis".

Second, others might argue that management styles can be irrelevant to corporate performance in times of uncertainty. Specifically, firm performance can be largely driven in a systematic way so that variations in managerial ability may no longer play an important role, especially in times of uncertainty. Given a massive spike in uncertainty induced by the pandemic, managers might not insert important roles in such rare events. Furthermore, if high managerial ability firms are already managing it efficiently, there might be less slack to absorb during times of crisis. This leads to the "irrelevance hypothesis".

Given mixed implications from extant literature, the impacts of managerial ability on corporate outcomes during the pandemic remains an open and important empirical question that we attempt to answer in the following sections.[4]

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[3] While our evidence suggests that managerial ability matters to the equity market during the pandemic period, managerial ability can also be relevant to other stakeholders' decisions such as banks' lending policies, auditors' professional engagement, and policy makers' guideline and standard formulation.

[4] Two concurrent papers that also explore corporate performance during the pandemic (i.e., Uddin et al. (2022) and Kumar and Zbib (2022)). Our paper differs from these papers in a number of ways. First, Uddin et al. (2022) focus on intangible assets as a key variable of interest with managerial ability acting as a moderating factor while our paper examines whether, and to what extent, able managers should be of an especially important role during a crisis like the COVID-19 pandemic. The findings of Uddin et al. (2022) complement our study's findings as it provides an additional channel (i.e., intangible assets, in particular) through which competent managers can affect corporate operations at the onset of the pandemic. Second, we conduct a propensity score matching to minimize the possibility that firms managed by able managers can be different from those managed by non-able managers which can drive the documented findings. Third, to capture corporate resilience at the onset of the pandemic, in addition to corporate performance measures, we also consider three other important measures (namely, the volatility of stock returns, default risk, and stock market liquidity). Furthermore, our analyses of the impact of competent managers on employment, healthcare, and safety-related violations when the COVID-19 strikes offer unique insights into the role of managerial ability. Forth, we examine possible channels through which able managers can influence corporate outcomes at the onset of the pandemic and also provide in-depth analyses of the impact of managerial ability on corporate outcomes during the pandemic across industries. The within-industry analyses can provide more insights into the documented effects of managerial ability because some industries are more affected by the pandemic than others Finally, to ensure that our documented results are not driven by omitted variables, we account for a battery of firm

3. Data and summary statistics

3.1. Data and sample

We retrieve stock prices and returns data for all common stocks from the Center for Research in Security Prices (CRSP) and firm-specific accounting information from Compustat. We source managerial ability data from Demerjian et al. (2012). The other data we use include corporate ESG rating data from Sustainalytics, analyst coverage data from the I/B/E/S database, institutional ownership information from Thomson Reuters Institutional Holdings (13F) database, and board quality data from the ISS/RiskMetrics database. In evaluating how managerial ability shapes a firm resilience during the COVID-19 pandemic, we consider three basic corporate outcomes, including ((*i*) firm risk, ((*ii*) operating performance, and ((*iii*) default risk. We use accounting data reported for 2019 to construct control variables for firm fundamentals. Our final sample consists of 4,231 firm-quarters observations spanning the first two quarters of 2020, the latest available data at the time of writing the paper. The Appendix provides a detailed description of all the variables used in this study.

3.2. Measures of managerial ability

Managerial ability has several dimensions and hence is difficult to observe (Trueman, 1986; Baik et al., 2011). To capture managerial ability for each firm, we rely on the managerial ability score from Demerjian et al. (2012). These authors propose a two-step process to derive the efficiency with which managers transform corporate resources (e.g., capital, labor, intangible assets) into revenues.[5] Demerjian et al. (2012) use data envelopment analysis to model firm efficiency and disentangle manager-specific drivers from firm-specific characteristics such as firm fixed effects. Demerjian et al. (2012, 2013) show that their managerial ability score appears to better capture manager-specific efficiency than other measures of ability. Several subsequent studies (e.g., Chen et al., 2015a,b; Krishnan and Wang, 2015; Koester et al., 2017) also advocate that the Demerjian et al. (2012)'s measure is the most commonly accepted measure of CEO ability.

We use the managerial ability scores (*MA_SCORE*) in 2018, the latest data available at the time of writing the paper, as our first measure of managerial ability.[6] We also consider two alternative measures of managerial ability. First, we construct a

managerial ability score that is industries-adjusted and, therefore, comparable among firms across industries. The industry-adjusted managerial ability score (*MA_IND_ADJ*) is measured as the difference between individual firm *MA_SCORE* and industry mean *MA_SCORE*, scaled by industry standard deviation of the *MA_SCORE*. Second, we consider a dummy variable, denoted as *HIGH_MASCORE*, that takes the value of 1 if a firm's *MA_SCORE* score is above the sample median and zero otherwise.

3.3. Summary statistics

We present the descriptive statistics for variables employed in the paper in Panel A and the correlation matrix among these variables in Panel B of Table 1. The average (median) managerial ability score (*MA_SCORE*) is −0.011 (−0.052) with a standard deviation of 0.171, which indicates a considerable amount of variation in the cross-section. By construct, the industry-adjusted managerial ability score (*MA_IND_ADJ*) has a mean of 0 and a standard deviation of almost 1.

The average firm size (in logarithm form) is 6.891 and the average debt-to-asset ratio is 32%. The average (median) book-to-market ratio is 3.863 (2.338) and the average (median) ratio of cash to assets is 0.194 (0.099). A typical firm has a dividend yield of 0.010 and a ratio of advertising expenditures over book assets of 0.011.

On average, firms earn −0.064 percent return-on-asset over the first two quarters of 2020 when the COVID-19 pandemic strikes, confirming the adverse consequences of the pandemic on the corporate world. The average stock return volatility and distance-to-default over the COVID-19 pandemic are 0.061 and 8.069, respectively.

4. Empirical findings

In evaluating how managerial ability shapes a firm resilience during the COVID-19 pandemic, we consider three key corporate outcomes, including ((*i*) firm risk, ((*ii*) operating performance, and ((*iii*) default risk. We conduct both univariate analysis and regression analysis for each of the outcomes and present detailed discussions in this section.

4.1. Managerial ability and firm risk

We start our empirical analysis by examining whether managerial ability over the pre-COVID period matters for firm risk during the pandemic. We follow Brogaard et al. (2017) and use the standard deviation of stock returns to capture firm risk. Specifically, *RETVOL* and *RETVOL_MKTADJ* are stock return volatility based on raw daily returns and market-adjusted returns in each quarter of 2020, respectively.

We start our univariate analysis by forming portfolios based on firms' pre-COVID managerial ability scores. Specifically, we sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio return volatility in the first two quarters of 2020 by taking the average of the stock return volatility across all stocks in each portfolio.

Panel A of Table 2 reports the descriptive statistics for the stock return volatility across managerial ability sorted portfolios. *MA_SCORE* is the managerial ability score in 2018, measured following Demerjian et al. (2012) and *MA_IND_ADJ* is an industry-adjusted *MA_SCORE* measure. Firms in the high *MA_SCORE* (*MA_IND_ADJ*) portfolios have lower stock return volatility. The (5−1) row reports the average return volatility difference between the lowest and highest managerial ability groups. These univariate results in Panel A of Table 2 establish a negative relation

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qualities as grounded by the literature such as corporate social responsibility rating, board quality, analyst coverage, and institutional ownership, and find our results are robust. Overall, we believe our paper is significantly different from these concurrent papers and all papers provide important contributions to the growing literature that uncover possible explanations for the cross-section in firms' responses in times of crisis.

[5] As Demerjian et al. (2012) and Demerjian et al. (2013) note, high-ability managers generate more revenues for a given level of corporate resources or minimize the resources given the same level of revenues. More able managers, in other words, tend to "maximize the efficiency of resources" (Demerjian et al., 2012, page 1229).

[6] We thank Peter Demerjian, Baruch Lev, and Sarah McVay for making their managerial ability data available through their websites (https://peterdemerjian.weebly.com/managerialability.html). The data covers the years 1980 through 2018. We, therefore, use the latest managerial ability score in 2018 to measure the executive ability in the pre-COVID period. As part of sensitivity analysis, we also consider the average managerial ability score over five years prior to the COVID-19 pandemic (2014–2018). The average value over the pre-COVID period can allow us to capture a normal level of managerial efficiency, and at the same time, mitigate the impacts of extreme values. We report the results for these alternative measures of managerial ability in the Online Appendix and find our results are robust.

Table 1

Summary statistics.

Panel A: Descriptive statistics						
Variable	Observations	Mean	SD	P25	P50	P75
Managerial ability measures						
MA_SCORE	4,231	−0.011	0.171	−0.119	−0.052	0.046
MA_IND_ADJ	4,231	0.000	0.995	−0.672	−0.217	0.444
HIGH_MASCORE	4,231	0.496	0.500	0.000	0.000	1.000
Firm level variables						
RETVOL	4,231	0.061	0.032	0.041	0.053	0.071
RETVOL_MKTADJ	4,231	0.051	0.033	0.030	0.042	0.061
DTD	4,028	8.069	6.811	3.527	6.297	10.408
LNSIZE	4,231	6.891	2.124	5.461	7.026	8.319
LEVERAGE	4,231	0.321	0.248	0.121	0.294	0.456
BTM	4,231	3.863	7.628	1.163	2.338	4.856
TANGIBILITY	4,231	0.004	0.013	0.000	0.000	0.001
CASH	4,231	0.194	0.226	0.033	0.099	0.265
ROE	4,231	−0.209	1.399	−0.176	0.052	0.161
DIVIDEND_YIELD	4,231	0.010	0.022	0.000	0.000	0.013
ADVERTISTING	4,231	0.011	0.031	0.000	0.000	0.007
ROA	4,519	−0.064	0.280	−0.068	0.020	0.063
ASSET_TURNOVER	4,511	0.195	0.153	0.093	0.158	0.255
TOBIN'Q	4,511	2.246	2.243	1.048	1.485	2.532

Panel B: Correlation matrix											
	MA_SCORE	RETVOL	DTD	LNSIZE	LEVERAGE	BTM	CASH	TANGIBILITY	ROE	DIVIDEND_YIELD	ADVERTISTING
MA_SCORE	1										
RETVOL	−0.089*	1									
DTD	0.0927*	−0.3352*	1								
LNSIZE	0.1609*	−0.2755*	0.1687*	1							
LEVERAGE	−0.0762*	0.2186*	−0.2605*	0.2211*	1						
BTM	0.0355*	−0.1093*	0.1166*	−0.0259	−0.1155*	1					
TANGIBILITY	−0.0162	0.2051*	−0.0809*	−0.4603*	−0.062*	−0.036*	1				
CASH	0.1150*	−0.0333*	0.0247	−0.3787*	−0.2967*	0.1790*	0.0363*	1			
ROE	0.0416*	−0.2190*	0.1102*	0.2357*	0.0032	−0.1517*	−0.1648*	−0.1682*	1		
DIVIDEND_YIELD	0.0681*	−0.0493*	0.0508*	0.2251*	0.1476*	−0.0841*	−0.0677*	−0.2171*	0.1003*	1	
ADVERTISTING	0.0202	−0.0069	0.0157	−0.0511*	0.0129	0.0679*	0.0155	0.0258	−0.0148	−0.0374*	1

The table reports the descriptive statistics (Panel A) and correlation matrix (Panel B) for the sample covering 4,231 firm–quarter observations over the first two quarters of 2020. *MA_SCORE* is the managerial ability score in 2018, measured following Demerjian et al. (2012). *MA_IND_ADJ* is the industry-adjusted managerial ability score. *HIGH_MASCORE* is a dummy variable that takes the value of 1 if a firm's *MA_SCORE* scores above the sample median and zero otherwise. Panel B presents the Pearson correlation matrix of the main variables in this study. * denotes significance at the 5% level or better. The Appendix provides detailed descriptions of the variables.

between managerial ability and stock return volatility at the univariate level.

However, some of the differences in stock return volatility could be due to other firm characteristics. We, therefore, employ a regression framework where we can control for firm-specific characteristics and time-invariant factors at the same time. We use the following regression:

$$RETVOL_{i,t} = f(MA_{i,t-1}, CONTROL_{i,t-1}, FEs), \tag{1}$$

where *RETVOL* is the standard deviation of stock returns over the first and second quarter of 2020; *MA* refers to two measures of managerial ability (*MA_SCORE* and *MA_IND_ADJ*) over the pre-COVID period; *CONTROL* refers to firm-level control variables in 2019; and *FEs* refer to industry-fixed effects and quarter-fixed effects. We control for various firm characteristics that can be associated with stock return volatility, including firm size (*LN_SIZE*), debt-to-asset ratio (*LEVERAGE*), cash holding (*CASH*), book-to-market ratio (*BTM*), the ratio of tangible assets to total assets (*TANGIBILITY*), return-on-equity ratio (*ROE*), dividend per share (*DIVIDEND_YIELD*), and advertising expenditure (*ADVERTISTING*).

Our inclusion of quarter fixed effects and industry-fixed effects (based on the Fama and French 48 industries classification) in the regression models serves two purposes. First, quarter fixed effects and industry-fixed effects are employed to control for time- and industry-invariant factors that could be associated with stock return volatility. Second, the inclusion of industry fixed effects accounts for the possibility that the impact of the COVID-19 pandemic may vary across different industries with some industries

being more affected by the pandemic than others (McKinsey and Company, 2020; Zandi, 2020). To correct for cross-sectional and time-series dependence, we use robust standard errors clustered simultaneously by both firm and quarter dimensions (Petersen, 2009; Gow et al., 2010; Thompson, 2011).[7]

Panel B of Table 2 presents regressions results for stock return volatility based on raw returns (models 1 to 4) and market-adjusted returns (models 5 to 8). We find that the coefficient estimates on all managerial ability measures (*MA_SCORE* and *MA_IND_ADJ*) are negative and significant across different model specifications: models without firm controls (models 1, 3, 5, and 7) and models with all controls (models 2, 4, 6, and 8). This suggests firms led by more able managers exhibit lower firm risk during the COVID-19 pandemic. In model (4), when the industry-adjusted managerial ability score increases by one standard deviation, there is a reduction of 0.0012 in return volatility (= 0.995 × 0.0012). Given that the sample mean of return volatility is 0.061, model (4) suggests that a one standard deviation increases in *MA_IND_ADJ* translates to about 2% (= 0.0012/ 0.061) drop in a stock return volatility relative to the sample mean.

Consistent with prior studies (e.g., (Skinner, 1989; Bae et al., 2004; Albuquerque et al., 2020; Ramelli and Wagner, 2020)), we find stock return volatility is lower for larger firms, firms with higher expected growth prospects, and firms with higher return-on-equity ratio, while higher for firms with higher leverage.

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[7] We also cluster standard errors by industry, by quarter, or by both industry and quarter, and find the results (untabulated for brevity) are qualitatively unchanged.

Table 2

Univariate and multivariate analysis for stock return volatility.

Panel A: Univariate analysis		
Managerial ability	Portfolios sorted by *MA_SCORE*	
	(1) *RETVOL*	(2) *RETVOL_MKTADJ*
1 (Low)	0.0659	0.0559
2	0.0627	0.0530
3	0.0623	0.0542
4	0.0625	0.0535
5 (High)	0.0576	0.0468
5 - 1	−0.0083***	−0.0091***
t-statistic	(−3.98)	(−4.28)

Panel B: Regression analysis: Stock return volatility based on raw returns								
	RETVOL				*RETVOL_MKT_ADJ*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MA_SCORE	−0.0253***	−0.0069***			−0.0271***	−0.0051**		
	(−6.12)	(−3.22)			(−7.79)	(−2.27)		
MA_IND_ADJ			−0.0038***	−0.0012***			−0.0041***	−0.0010**
			(−6.74)	(−3.23)			(−8.09)	(−2.41)
LNSIZE		−0.0048***		−0.0048***		−0.0063***		−0.0063***
		(−5.49)		(−5.36)		(−14.78)		(−14.02)
LEVERAGE		0.0336***		0.0337***		0.0339***		0.0340***
		(10.02)		(10.17)		(9.26)		(9.39)
BTM		−0.0003***		−0.0003***		−0.0003***		−0.0003***
		(−3.77)		(−3.78)		(−4.56)		(−4.58)
TANGIBILITY		0.0560		0.0576		0.0863		0.0881*
		(0.98)		(1.00)		(1.62)		(1.65)
CASH		−0.0083		−0.0081		−0.0098*		−0.0096*
		(−1.38)		(−1.31)		(−1.92)		(−1.81)
ROE		−0.0035***		−0.0035***		−0.0037***		−0.0037***
		(−6.19)		(−6.25)		(−6.35)		(−6.39)
DIVIDEND_YIELD		−0.0747**		−0.0731**		−0.0624		−0.0610
		(−2.17)		(−2.10)		(−1.62)		(−1.56)
ADVERTISING		0.0072		0.0078		0.0148		0.0155
		(0.32)		(0.34)		(0.72)		(0.74)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes		Yes
S.E. clustered	Firm, Quarter	Firm, Quarter	Firm, Quarter	Firm, Quarter	Firm, Quarter	Firm, Quarter		Firm, Quarter
Adjusted R-squared	0.1343	0.3055	0.1320	0.3057	0.1223	0.3468	0.1196	0.3470
Observations	4,231	4,231	4,231	4,231	4,231	4,231	4,231	4,231

Panel C: Propensity-score-matched sample analysis				
	Treat (1)	Control (2)	Difference (1)–(2)	*p*-value
Firm characteristics				
LNSIZE	6.714	6.743	−0.029	(0.71)
LEVERAGE	0.311	0.327	−0.016	(0.11)
BTM	4.343	3.914	0.429	(0.80)
TANGIBILITY	0.008	0.006	0.003	(0.27)
CASH	0.215	0.208	0.007	(0.41)
ROE	−0.224	−0.132	−0.091	(0.57)
DIVIDEND_YIELD	0.012	0.012	0.000	(0.84)
ADVERTISING	0.010	0.010	0.000	(0.73)
Stock return volatility				
RETVOL	0.059	0.062	−0.003***	(0.01)
RETVOL_MKT_ADJ	0.050	0.052	−0.002**	(0.05)

Panel A of the table reports the distribution of stock return volatility by managerial ability quintile groups. We sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio return volatility in the first two quarters of 2020 by taking the average of the stock return volatility across all stocks in the portfolio. The *5-1* measure row reports the average return volatility difference between the low and high managerial ability groups. Panel B reports the results of regressions of the stock return volatility over the first two quarters of 2020 on managerial ability scores under several model specifications: without firm controls (models 1, 3, 5, and 7) and with all controls (models 2, 4, 6, and 8). *MA_SCORE* is the managerial ability score in 2018, measured following Demerjian et al. (2012). *RETVOL* and *RETVOL_MKT_ADJ* are stock return volatility based on raw returns and market-adjusted returns in each quarter of 2020, respectively. Panel C reports the results based on the propensity score matching approach. The treatment (control) group includes firms with (without) the managerial ability scores in 2018 above the sample median. We use propensity scores to perform one-to-one nearest-neighbor matching within 0.01 caliper without replacement. We present the post-match diagnostic analysis in Panel C. *HIGH_MASCORE* is a dummy variable that takes the value of 1 if a firm's *MA_SCORE* score in 2018 is above the sample median and zero otherwise. Industry and year-quarter fixed effects are included in all models. The *t*-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed descriptions of the variables.

We further employ the propensity score matching approach to minimize the possibility that firms managed by able managers can be different from those managed by non-able managers.[8] We first estimate the probability of being assigned to the treatment or control group using a logistic regression with all firm-level controls as specified in the baseline regression (Eq. (1)). The treatment (control) group includes firms with (without) managerial ability scores in 2018 above the sample median. We then use propensity scores to perform one-to-one nearest-neighbor matching within 0.01% caliper without replacement.

We report the average treatment effect estimates in Panel C of Table 2. There are two key results from Table 2's Panel C. First, the results suggest that treated firms and their matched control firms have similar characteristics, which confirms the high quality of the match. Second and more importantly, we find that return volatility is lower for firms in the treatment group relative to firms in the control group. Overall, Table 2's results suggest that firms with more able managers are associated with lower return volatility and that this effect is not entirely driven by firm fundamentals.

4.2. Managerial ability and operating performance

We next investigate whether, and to what extent, managerial ability affects the way their firms respond to the COVID-19 pandemic. We consider two measures of operating performance in the first two quarters of 2020, including return-on-asset (*ROA*) and Tobin's Q.[9] Specifically, return on assets (*ROA*) is measured as the operating income before depreciation over book assets during the first and second quarter of 2020. Tobin's Q is measured as the ratio of book assets minus book equity plus the market value of equity over book assets. Consistent with the previous section, we conduct both univariate analysis (Panel A) and regression analysis (Panel B) and report the results for these tests in Table 3.

In Panel A of Table 3, we sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio operating performance in the first two quarters of 2020 by taking the average of each of the performance measures across all stocks in the portfolios. Panel A reports the descriptive statistics for the operating performance across managerial ability sorted portfolios. Firms in high managerial ability portfolios have higher return-on-asset ratios and Tobin's Q ratios. The (5–1) row reports the average firm operating performance difference between the low and high managerial ability groups. These univariate results in Table 3's Panel A suggest a positive relation between more able management and firm performance at the univariate level.

We continue to examine how managerial ability shapes the way a firm responds to the pandemic by employing a regression framework where we can control for firm-specific characteristics and time-invariant factors at the same time. We use the following regression:

$$PERFORM_{i,t} = f(MA_{i,t-1}, CONTROL_{i,t-1}, FEs), \qquad (2)$$

where *PERFORM* refers to firm performance over the first and second quarter of 2020; *MA* refers to measures of managerial ability (*MA_SCORE* and *MA_IND_ADJ*) over the pre-COVID period; *CONTROL* refers to firm-level control variables in 2019, and *FEs* refer to industry-fixed effects and quarter-fixed effects. We control for various firm characteristics as in Table 2, except return-on-equity ratio as it can be highly correlated with a firm's operating

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[8] We thank the referee for suggesting these analyses.

[9] We also consider several alternative measures of firm performance, including operating profit margin and asset turnover. We report the results for these analyses in Table 7 and find our results are robust.

Table 3
Managerial ability and operating performance.

Panel A: Univariate analysis

Managerial ability	Portfolios sorted by *MA_SCORE*	
	(1) Tobin's Q	(2) ROA
1 (Low)	1.9782	−0.1236
2	1.9306	−0.0738
3	2.1731	−0.0652
4	2.5081	−0.0433
5 (High)	2.6400	−0.0148
5 - 1	0.6618***	0.1088***
t-statistic	(6.03)	(8.12)

Panel B: Cross-sectional regressions

	Tobin's Q (1)	ROA (2)	Tobin's Q (4)	ROA (5)
MA_SCORE	1.266***	0.108***		
	(4.61)	(2.60)		
MA_IND_ADJ			0.223***	0.013**
			(5.43)	(2.16)
LNSIZE	0.021	0.039***	0.020	0.039***
	(0.74)	(8.71)	(0.71)	(9.06)
LEVERAGE	1.070***	−0.232***	1.057***	−0.235***
	(5.39)	(−8.72)	(5.31)	(−8.82)
BTM	0.097***	0.000	0.097***	0.000
	(7.92)	(0.31)	(8.01)	(0.32)
TANGIBILITY	10.265*	−4.682***	9.905*	−4.662***
	(1.81)	(−4.44)	(1.74)	(−4.41)
CASH	3.285***	−0.212***	3.238***	−0.210***
	(11.95)	(−5.06)	(11.74)	(−5.07)
DIVIDEND_YIELD	−3.105***	0.983***	−3.387***	0.983***
	(−3.39)	(5.07)	(−3.68)	(5.12)
ADVERTISTING	4.269***	−0.116	4.120***	−0.112
	(3.89)	(−0.48)	(3.75)	(−0.47)
Industry fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.316	0.400	0.318	0.399
Observations	4,471	4,479	4,471	4,479

Panel C: Propensity-score-matched sample analysis

	Treat (1)	Control (2)	Difference (1)–(2)	*p*-value
Firm characteristics				
LNSIZE	6.661	6.691	−0.030	(0.70)
LEVERAGE	0.304	0.314	−0.010	(0.31)
BTM	4.247	3.816	0.432	(0.79)
TANGIBILITY	0.247	0.248	−0.001	(0.91)
CASH	0.209	0.207	0.002	(0.77)
DIVIDEND_YIELD	0.012	0.012	0.001	(0.75)
ADVERTISING	0.010	0.011	−0.001	(0.45)
Operating performance				
Tobin's Q	2.460	2.115	0.344***	(0.00)
ROA	−0.048	−0.105	0.057***	(0.00)

Panel A reports the distribution of operating performance measures by managerial ability quintile groups. We sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio operating performance in the first two quarters of 2020 by taking the average of the performance measures across all stocks in the portfolio. Panel B reports the results of regressions of operating performance measures over the first two quarters of 2020 on managerial ability scores. The operating performance measures include Tobin's Q and return-on-assets (*ROA*). *MA_SCORE* is the managerial ability score in 2018, measured following Demerjian et al. (2012). Panel C reports the results based on the propensity score matching approach. The treatment (control) group includes firms with (without) the managerial ability scores in 2018 above the sample median. We use propensity scores to perform one-to-one nearest-neighbor matching within 0.01 caliper without replacement. We present the post-match diagnostic analysis in Panel C. *HIGH_MASCORE* is a dummy variable that takes the value of 1 if a firm's *MA_SCORE* score in 2018 is above the sample median and zero otherwise. Industry and quarter fixed effects are included in all models. The *t*-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed descriptions of the variables.

performance measures in the first two quarters of 2020. We also include quarter fixed effects and industry-fixed effects to control for time- and industry-invariant factors that could be associated with a firm's operating performance. Consistent with the previous section, we use robust standard errors clustered simultaneously by both firm and quarter dimensions (Petersen, 2009; Gow et al., 2010) and present the regression results for operating performance in Panel B of Table 3.

We find that the coefficient estimates on managerial ability measure (*MA_SCORE)* are all positive and significant across different model specifications, suggesting that firms led by more competent managers are more resilient during the COVID-19 pandemic. In model (4), when the industry-adjusted managerial ability score increases by one standard deviation, there is an increase of 0.222 in Tobin's Q (= 0.995 × 0.223). Given that the sample mean of *Tobin's Q* is 2.246, model (4) suggests that a one standard deviation increase in *MA_IND_ADJ* translates to a 9.88% (= 0.222/ 2.246) increase in Tobin's Q relative to the sample mean. We, therefore, conclude that there is an economically significant relation between managerial ability and the average operating performance during the COVID-19 pandemic.

Consistent with the previous analyses, we further adopt the propensity score matching approach to ensure that we compare the corporate performance of firms with more able managers and performance outcomes of otherwise similar firms. Similar to the previous analyses, we first estimate the probability of being assigned to the treatment or control group using a logistic regression with all firm-level controls as specified in the baseline regression (Eq. (2)). The treatment (control) group includes firms with (without) managerial ability scores in 2018 above the sample median. We then use propensity scores to perform one-to-one nearest-neighbor matching within 0.01% caliper without replacement. We report the average treatment effect estimates in Panel C of Table 3. We find that treated firms and their matched control firms have similar characteristics, which confirms the high quality of the match. In addition, we find that operating performance, measured by ROA and Tobin's Q, is higher for firms in the treatment group relative to firms in the control group. Overall, Table 3's results suggest that firms led by more competent managers are more resilient during the COVID-19 pandemic.

4.3. Managerial ability and default risk

Corporate default, generally defined as a breach of contract and occurs when a firm is unable to fulfill its debt obligations, is one of the most unfavorable events in the life of the corporate world (Merton, 1974; Bharath and Shumway, 2008). As the COVID-19 pandemic has heightened default risk for corporations (Aramonte and Avalos, 2020), we examine whether managerial ability can keep firms out of these troubles.

We follow Bharath and Shumway (2008) and Brogaard et al. (2017) and use Merton (1974)'s distance-to-default (*DTD*) to capture default risk. Following Bharath and Shumway (2008) and Brogaard et al. (2017), we compute the DTD as follows:

$$DTD_{i,t} = \frac{\log\left(\frac{Equity_{i,t} + Debt_{i,t}}{Debt_{i,t}}\right) + \left(r_{i,t-1} - \frac{\sigma_{Vi,t}^2}{2}\right) \times T_{i,t}}{\sigma_{Vi,t} \times \sqrt{T_{i,t}}} \quad (3a)$$

$$\sigma_{Vi,t} = \frac{Equity_{i,t} + Debt_{i,t}}{Debt_{i,t}} \times \sigma_{Ei,t} + \frac{Debt_{i,t}}{Equity_{i,t} + Debt_{i,t}} \times (0.05 + 0.25 \times \sigma_{Ei,t}) \quad (3b)$$

where $Equity_{i,t}$ is the market value of equity, measured as the product of the number of shares outstanding and the stock price at the end of each quarter; $Debt_{i,t}$ is the face value of debt,

measured as the sum of debt in current liabilities and one-half the long-term debt at the end of the quarter; $r_{i,t-1}$ is firm i's past quarterly return; $\sigma_{Ei,t}$ is the stock return volatility for firm i during quarter t, estimated using the daily stock return from the previous quarter; $\sigma_{Vi,t}$ is an approximation of the volatility of firm assets; and $T_{i,t}$ is set to one. A high (low) *DTD* value indicates low (high) default risk.

The impact of the COVID-19 pandemic may vary across different industries with several industries being more deeply affected by the pandemic than others (e.g., (McKinsey and Company, 2020; Zandi, 2020)), leading to variations in default probability across industries. We, therefore, consider an industry-adjusted distance-to-default as an alternative measure of default risk. The industry-adjusted distance-to-default (*DTD_IND_ADJ*) is measured as the difference between individual firm *DTD* and industry mean *DTD*, scaled by industry standard deviation of the default risk measure.

We report our univariate analysis in Panel A and regression analyses for default risk in Panel B of Table 4. For the univariate analysis, we sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio distance-to-default in the first two quarters of 2020 by taking the average of the *DTD* measure across all stocks in the portfolios. We report the descriptive statistics for the *DTD* across managerial ability sorted portfolios in Panel A of Table 4.

Fig. 1 plots the average value of default risk measures for quintile portfolios by managerial ability measures. Portfolio 1 (Portfolio 5) is the lowest (the highest) managerial ability group. The difference in the average default risk measures between the highest (Portfolio 5) and the lowest managerial ability portfolio (Portfolio 1) is significant at the 1% level. We find firms led by more able managers have higher distance-to-default and hence lower default risk. These univariate results in Fig. 1 and Table 4 Panel A suggest a positive relation between managerial ability and corporate distance-to-default at the univariate level.

For the regression analysis, we use the following regression:

$$DTD_{i,t} = f(MA_{i,t-1}, CONTROL_{i,t-1}, FEs), \quad (4)$$

where *DTD* refers to default risk measure (*DTD*) over the first and second quarter of 2020; *MA* refers to two measures of managerial ability (*MA_SCORE* and *MA_IND_ADJ*); *CONTROL* refers to firm-level control variables in 2019, and *FEs* refer to industry-fixed effects and quarter-fixed effects. We control for various firm characteristics that can be related to default risk as per Bharath and Shumway (2008) and Brogaard et al. (2017). The additional control variables include firm size (*LNSIZE*), leverage ratio (*LEVERAGE*), book-to-market ratio (*BTM*), the ratio of tangible assets to total assets (*TANGIBILITY*), the ratio of net income to total assets (*INCOME/ASSET*), excess returns (*EXCESS_RETURN*), and the inverse of stock return volatility (*INVESE_SIGMA*). Consistent with previous sections, we include quarter fixed effects and industry-fixed effects to control for time- and industry-invariant factors that could be associated with a firm's probability of default and use robust standard errors clustered simultaneously by both firm and quarter dimensions (Petersen, 2009; Gow et al., 2010; Thompson, 2011).

We present the regression results for default risk in Panel B of Table 4 and additional regression results in Appendix A. We find that the coefficient estimates on managerial ability measures are all positive and statistically significant and they are true for ((*i*) different measures of default risk, ((*ii*) alternative measures of managerial ability, and ((*iii*) different model specifications. The results consistently suggest that firms led by more able managers exhibit lower default risk during the COVID-19 pandemic.

In model (4) of Table 4, when the industry-adjusted managerial ability score increases by one standard deviation, there is a
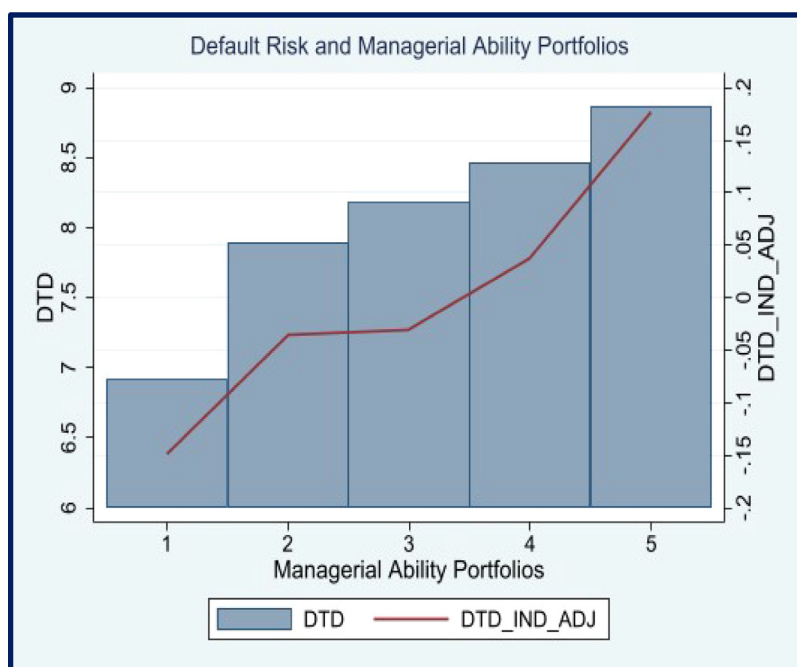
Fig. 1. Corporate default risk across managerial ability portfolios.
Fig. 1 plots the average value of default risk measures for quintile portfolios by managerial ability measures. We sort all firms in the sample into quintile portfolios based on the pre-COVID managerial ability scores. Portfolio 1 (Portfolio 5) is the lowest (the highest) managerial ability group. We then calculate the average default risk over the first two quarters of 2020 for each quintile portfolio. *DTD* is Merton (1974)'s distance to default measure. *DTD_IND_ADJ* is the industry-adjusted distance to default measure. All variables are described in the Appendix.

drop of 0.248 in distance-to-default (= 0.995 × 0.249). Given that the sample mean of the *DTD* measure is 8.069, model (6) suggests that a one standard deviation increase in *MA_IND_ADJ* translates to a 3.07% (= 0.248/ 8.069) drop in distance-to-default relative to the sample mean. We, therefore, conclude that there is an economically significant relation between executive ability and corporate default risk during the COVID-19 pandemic.

Consistent with the previous analyses, we further adopt the propensity score matching approach to ensure that we compare the default risk of firms with more able managers and default risk measure of otherwise similar firms. We report the results for these analyses in Panel C of Table 4. Two main findings are worth noting. First, we find that treated firms and their matched control firms have similar characteristics, which confirms the high quality of the match. Second, we find that the distance-to-default measure is higher for firms in the treatment group relative to firms in the control group. Overall, Table 4's results indicate that firms led by more competent managers exhibit lower default risk during the COVID-19 pandemic.[10]

4.4. Managerial ability and corporate outcomes across industries

We next investigate the impact of managerial ability on corporate outcomes during the pandemic across industries.[11] These within-industry analyses can provide more insights into the documented effects of managerial ability because some industries are more affected by the pandemic than others (e.g., (Guan et al., 2020; McKinsey and Company, 2020)). We, therefore, repeat our baseline models for each of the corporate outcomes in each of the Fama and French 5 industries. We report the results for these analyses in Table 5.

Panel A of Table 5 reports descriptive statistics across industries and Panel B presents regression results. We find that able managers have significant impacts on their firms' default risk during the pandemic in most industries, with the effect being more pronounced among firms in consumer durables, nondurables, wholesale, mines, construction, transportation, hotels, entertainment, finance, manufacturing, energy, and utility industries. We find no evidence for the significant impacts of managerial ability on the stock return volatility of firms in the hi-tech, healthcare, medical equipment, and drugs sectors. In addition, firms with more able managers are associated with higher *Tobin's Q* and higher *ROA* for a majority of Fama and French 5 industries. Overall, Table 5's results suggest that the impact of managerial ability on corporate outcomes during the pandemic varies across industries.[12]

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[10] We further examine the impact of managerial ability on corporate outcomes conditioned on the opaqueness of the information environment. We use innovation activities to capture information opacity and repeat our baseline models for two subsamples: innovative firms versus other firms. We define innovative firms as those with the R&D expenditures above the sample median. We report the results for these analyses in Appendix A. We find that the effect of managerial ability on the volatility of stock returns, during the pandemic is more pronounced among other firms than innovative firms. There is mixed evidence regarding the firm performance and no evidence for significant impacts of innovative activities on the relation between able managers and default risk during the pandemic. We thank the referee for suggesting this test.

[11] We thank the referee for suggesting this analysis.

[12] We also explore the effects of organizational complexity on the relation between managerial ability and corporate outcomes during the pandemic. We follow Chen, Gul, Veeraraghavan, and Zolotoy (2015) and rely on the number of business segments to capture the level of organizational complexity. We then repeat our baseline models for high versus low organizational complexity subsamples and report the results for these analyses in Appendix A. We find that the effect of managerial ability on default risk during the pandemic is more pronounced among firms with high rather than low organizational complexity, which is evidenced by the tests for the coefficient differences across different subsamples. There is mixed evidence regarding the firm performance (as measured by *ROA* and *Tobin's Q*) and no evidence of significant impacts of organizational complexity on the relation between able managers and stock return volatility during the pandemic. We thank the referee for suggesting this test.

Table 4
Managerial ability and default risk during the pandemic.

Panel A: Univariate analysis

Managerial ability	DTD		DTD_IND_ADJ	
	(1) MA_SCORE	(2) MA_IND_ADJ	(3) MA_SCORE	(4) MA_IND_ADJ
1 (Low)	6.9183	7.1041	−0.1414	−0.1417
2	7.8959	7.4795	−0.0460	−0.0796
3	8.1814	8.3603	−0.0272	0.0172
4	8.4655	8.2665	0.0279	0.0090
5 (High)	8.8693	9.1364	0.1868	0.1952
5 - 1	1.9510***	2.0323***	0.3282***	0.3369***
t-statistic	(5.86)	(6.03)	(6.47)	(6.74)

Panel B: Regression analysis

	Dependent Variable: DTD			
	(1)	(2)	(3)	(4)
MA_SCORE	4.5760***	1.5241***		
	(5.16)	(3.09)		
MA_IND_ADJ			0.6606***	0.2493***
			(4.73)	(3.34)
LNSIZE		−0.3843***		−0.3818***
		(−6.20)		(−6.28)
LEVERAGE		−6.2792***		−6.2912***
		(−16.06)		(−16.10)
BTM		0.0365***		0.0365***
		(3.80)		(3.82)
TANGIBILITY		−15.2942*		−15.4494*
		(−1.72)		(−1.76)
INCOME/ASSET		5.9931***		6.0225***
		(7.15)		(7.28)
EXCESS_RETURN		3.6106***		3.6123***
		(18.14)		(18.61)
INVERSE_SIGMA		2.9652***		2.9659***
		(52.98)		(52.98)
Industry fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.0538	0.6317	0.0511	0.6317
Observations	4,028	4,028	4,028	4,028

Panel C: Propensity-score-matched sample analysis

	Treat (1)	Control (2)	Difference (1)–(2)	p-value
Firm characteristics				
LNSIZE	6.556	6.650	−0.094	(0.25)
LEVERAGE	0.308	0.311	−0.004	(0.69)
BTM	3.641	3.771	−0.130	(0.65)
TANGIBILITY	0.249	0.251	−0.002	(0.80)
INCOME/ASSET	−0.026	−0.024	−0.003	(0.38)
EXCESS_RETURN	−0.997	−0.993	−0.004	(0.51)
INVERSE_SIGMA	2.799	2.852	−0.053	(0.40)
Default risk				
DTD	7.833	7.338	0.496**	(0.04)

Panel A reports the distribution of default risk measures by managerial ability quintile groups. We sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio default risk in the first two quarters of 2020 by taking the average of the default risk measures across all stocks in the portfolio. Panel B reports the results of regressions of default risk measures over the first two quarters of 2020 on managerial ability scores. We use Merton (1974)'s distance-to-default (DTD) to capture default risk. DTD_IND_ADJ is the industry-adjusted distance-to-default measure. MA_SCORE is the managerial ability score in 2018, measured following Demerjian et al. (2012). MA_IND_ADJ is the industry-adjusted managerial ability score. Panel C reports the results based on the propensity score matching approach. The treatment (control) group includes firms with (without) the managerial ability scores in 2018 above the sample median. We use propensity scores to perform one-to-one nearest-neighbor matching within 0.01 caliper without replacement. We present the post-match diagnostic analysis in Panel C. HIGH_MASCORE is a dummy variable that takes the value of 1 if a firm's MA_SCORE score in 2018 is above the sample median and zero otherwise. The t-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed descriptions of the variables.

4.5. Possible channels

We continue to explore the mechanisms through which able managers can influence corporate outcomes at the onset of the pandemic. One possible channel through which managerial ability affects firm operations is by making less idiosyncratic decisions, which can result in less volatile cash flows during times of uncertainty.[13] We conduct two tests to explore this possibility. First, we use idiosyncratic risks to account for idiosyncratic decisions and examine whether firms with more competent managers are associated with lower idiosyncratic volatility. Second, we consider the effect of managerial ability on the volatility of a firm's cash flows. Another possible channel that managers can sustain firm performance during the pandemic is to maintain a better relationship with key stakeholders.[14] We focus on employees, a key human capital and one of the driving forces of corporate performance, and examine whether firms with more competent managers can foster good working conditions for their employees.

We calculate idiosyncratic volatility (IVOL) following Ang et al. (2006) as the standard deviation of the residuals from a Fama and French (1993) and Carhart (1997) four-factor regression of the stock's excess return on the market excess return, size, book-to-market ratio, and momentum factors using daily return data in 2020. We measure the volatility of a firm's cash flows (CFVOL) as the standard deviation of quarterly net incomes over total sales in 2020. Following Bae et al. (2011) and Chen et al. (2016), we construct employee treatment scores (Employee Treatment) based on the MSCI/KLD database. The MSCI/KLD database assigns a binary rating for each category for each firm year. We consider both strengths and concerns categories of employee relation (e.g., including employee involvement, cash profit-sharing, retirement benefits, union relations, and health and safety) and construct a net measure that adds strengths and subtracts concerns (Lins et al., 2017).[15] MA_SCORE is the managerial ability score in 2018, measured following Demerjian et al. (2012). We control for several firm characteristics that can be associated with idiosyncratic volatility and corporate social responsibility, including firm size (LN_SIZE), debt-to-asset ratio (LEVERAGE), book-to-market ratio (BTM), the ratio of tangible assets to total assets (TANGIBILITY), and operating income scaled by total sales (OPERATING_INCOME). We report the results for these analyses in Table 6. Panel A reports the results for the impacts of pre-pandemic managerial ability on idiosyncratic risk and cash flow volatility in 2020. Panel B reports the results for the effect of managerial ability on employee treatment.

Panel A's results suggest that firms with more able managers are associated with lower idiosyncratic volatility and lower volatile cash flows during the pandemic. Panel B's results suggest that firms with more competent managers maintain a better relationship with their employees who are the driving forces of corporate performance. Overall, Table 6 provides some evidence of the possible mechanisms through which able managers can influence corporate outcomes at the onset of the pandemic.

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[13] We thank the referee for suggesting this test.

[14] We thank the Associate Editor for suggesting this possibility.

[15] As the number of strengths and concerns for each category varies over time, we follow Servaes and Tamayo (2013) and scale the strengths (concerns) for each category by dividing the number of strengths (concerns) for each firm year by the maximum number of strengths (concerns) possible for each category year. The higher Employee Treatment value indicates a better employee treatment. We use the MSCI/KLD data in 2019, the latest available data at the time of writing the paper.

Table 5
Managerial ability and corporate outcomes across industries.

Panel A: Descriptive statistics across industries					
	FF1	FF2	FF3	FF4	FF5
Average value of *MASCORE*	−0.00898	−0.02099	−0.16838	−0.00686	−0.01630
Average value of *RETVOL*	0.05684	0.06754	0.05434	0.06351	0.06160
Average value of *ROA*	0.00691	−0.01025	−0.04916	−0.27005	0.00683
Average value of *Tobin'Q*	1.79978	1.52394	2.76806	3.31426	1.58972
Average value of *DTD*	8.36720	7.84135	8.88395	7.67016	7.24752
Number of firms	342	455	515	395	316

Panel B: Regression analyses				
	RETVOL	ROA	Tobin's Q	DTD
	(1)	(2)	(3)	(4)
(FF1) Consumer Durables, Nondurables, Wholesale	−0.0144*	−0.0212	1.9252**	2.9159*
	(−1.85)	(−0.35)	(2.06)	(1.73)
(FF2) Manufacturing, Energy, and Utilities	−0.0176*	0.0896*	1.2264***	2.2020**
	(−1.88)	(1.88)	(4.28)	(2.23)
(FF3) Hitech: Business Equipment, Telephone and Television	0.0009	0.0769*	2.4584***	1.9110**
	(0.11)	(1.76)	(3.46)	(2.35)
(FF4) Healthcare, Medical Equipment, and Drugs	−0.0055	0.2015***	0.3856	0.8568
	(−0.80)	(2.73)	(0.76)	(0.79)
(FF5) Others: Mines, Construction, Trans, Hotels, Entertainment, Finance	−0.0118*	0.0781*	0.6161	2.4766**
	(−1.74)	(1.93)	(1.16)	(2.40)

The table reports descriptive statistics across industries (Panel A) and the results of regressions of several corporate outcomes measures over the first two quarters of 2020 on managerial ability scores (Panel B). *MA_SCORE* is the managerial ability score in 2018, measured following Demerjian et al. (2012). Industry classifications are based on Fama and French 5 Industry Portfolios. Corporate outcomes include (i) stock return volatility (*RETVOL*), (ii) operating performance measures (i.e., *Tobin's Q* and return-on-assets (*ROA*)), and (iii) default risk, proxied by Merton (1974)'s distance-to-default measure (*DTD*). Control variables are similar to controls in the baseline models in Table 2 (for *RETVOL*), Table 3 (for *ROA* and *Tobin's Q*), and Table 4 (for *DTD*). The *t*-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The Appendix provides detailed descriptions of the variables.

4.6. Difference-in-difference analysis

To address a potential identification challenge that managerial ability may not be entirely random, but rather a firm's endogenous choice, we use the COVID-19 outbreak and enforced lockdown as an exogenous shock.

We argue that managerial ability before COVID-19 is orthogonal to the pandemic. We then complement the cross-sectional regressions for several corporate outcomes in the previous sections with the difference-in-differences regressions to better identify the effect of managerial ability on corporate performance surrounding the COVID-19 pandemic. Specifically, we consider the following regression:

$$OUTCOMES = f(HIGH\_MASCORE \times COVID19, CONTROL, FEs), \quad (5)$$

where *OUTCOMES* refer to three corporate outcomes, including ((*i*) firm risk, ((*ii*) operating performance, and ((*iii*) default risk; *HIGH_MASCORE* is a dummy variable that takes the value of 1 if a firm's *MA_SCORE* score over the pre-COVID period is above the sample median and zero otherwise; *COVID19* is a dummy variable that takes the value of 1 for the first two quarters of 2020 and zero for the last two quarters of 2019;[16] and *FEs* refer to industry-fixed effects and quarter-fixed effects.

The parameter of interest is the coefficient on the interaction term (*HIGH_MASCORE* × *COVID19*) which captures the differential impacts of the COVID-19 pandemic on firms with high versus low pre-COVID managerial competency.[17] We focus on a short window of two quarters before and during the COVID-19 pandemic to capture its immediate impact, and at the same time, mitigate the possibility of confounding effects from other corporate and market events. We use robust standard errors clustered

simultaneously by both firm and quarter dimensions to correct for cross-sectional and time-series dependence (Petersen, 2009; Gow et al., 2010).

We report the results for these tests in Table 7. In Model (1), the coefficient estimate on the interaction term, *HIGH_MASCORE* × *COVID19,* is negative and statistically significant, indicating that firms led by highly competent management, when compared to their counterparts with low managerial ability, exhibit lower firm risk, proxied by the volatility of stock returns, during the COVID-19 pandemic compared to during the pre-COVID-19 period.

In Models (2) to (4), the coefficient estimate on the interaction term, *HIGH_MASCORE* × *COVID19,* is positive and statistically significant, indicating that firms led by more able managers, when compared to their counterparts with low managerial ability, are more resilient during the COVID-19 pandemic compared to during the pre-COVID-19 period, as evidenced by higher operating performance and lower default risk.

4.7. Managerial ability, firm-level COVID exposure, and corporate outcomes

As some firms can be more exposed to COVID-19 than others (Albuquerque et al., 2020; Bartik et al., 2020; Ding et al., 2021; Hassan et al., 2020; Nguyen et al., 2020a,b), we examine the impact of managerial competency on corporate outcomes amid the pandemic conditioning on the levels of firms' exposure to the pandemic. We employ a novel measure of firm-level exposure to the COVID-19 pandemic, captured by the frequency of keywords related to COVID-19 extracted from the earnings call transcripts developed by Hassan et al. (2020).[18] If a firm's managerial competency prior to the COVID-19 pandemic indeed influences its resilience during the pandemic, we expect this impact to be more pronounced for firms that are more exposed to the pandemic.

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[16] Our analysis ends in the second quarter of 2020 due to the data availability at the time of writing the paper.

[17] We cannot include both *HIGH_MASCORE*, *COVID19* dummy, and their interaction term (*HIGH_MASCORE* × *COVID19*) in the same model with fixed effects as these variables become omitted.

[18] We thank Tarek Hassan, Stephan Hollander, Laurence van Lent, Markus Schwedeler, and Ahmed Tahoun for making the firm-level exposure to COVID-19 data available at https://www.firmlevelrisk.com/.

Table 6
Possible channels.

Panel A: Managerial ability, idiosyncratic risk and cash flow volatility

	Dependent Variable: *IVOL*	Dependent Variable: *CFVOL*
	(1)	(2)
MA_SCORE	−0.0056*	−6.3868**
	(−1.70)	(−1.96)
LNSIZE	−0.0068***	−0.4455*
	(−16.87)	(−1.74)
LEVERAGE	0.0092***	−0.1514
	(2.88)	(−0.10)
BTM	−0.0006***	0.0351
	(−3.88)	(0.39)
TANGIBILITY	0.2172**	−0.2019
	(2.49)	(−0.15)
OPERATING_INCOME	−0.0002	44.9908*
	(−1.30)	(1.84)
Industry fixed effects	Yes	Yes
Adjusted R-squared	0.3397	0.0408
Observations	1,985	1,980

Panel B: Managerial ability and employee treatment

	Dependent Variable: *Employee Treatment*	
	(1)	(2)
MA_SCORE	0.2474***	0.1349***
	(5.72)	(3.23)
LNSIZE		0.0429***
		(7.83)
LEVERAGE		−0.0078
		(−0.27)
BTM		−0.0012**
		(−2.04)
TANGIBILITY		−0.0367
		(−0.94)
OPERATING_INCOME		0.0043
		(0.97)
Industry fixed effects	Yes	Yes
Adjusted R-squared	0.0551	0.1328
Observations	1,309	1,309

The table reports the results of regressions of idiosyncratic risk, cash flow volatility, and employee treatment on managerial ability scores. *MA_SCORE* is the managerial ability score in 2018, measured following Demerjian et al. (2012). We calculate idiosyncratic volatility (*IVOL*) following Ang et al. (2006) as the standard deviation of the residuals from a Fama and French (1993) and Carhart (1997) four-factor regression of the stock's excess return on the market excess return, size, book-to-market ratio, and momentum factors using daily return data in 2020. *CFVOL* is standard deviation of quarterly net incomes over total sales in 2020. Following Bae et al. (2011) and Chen et al. (2016), we construct employee treatment score (*Employee Treatment*) based on the MSCI/KLD database. We consider both strengths and concerns on employee relation and construct a net measure that adds strengths and subtracts concerns (Lins et al., 2017). As the number of strengths and concerns for each category varies over time, we follow Servaes and Tamayo (2013) and scale the strengths (concerns) for each category by dividing the number of strengths (concerns) for each firm year by the maximum number of strengths (concerns) possible for each category year. The higher *Employee Treatment* value indicates a better employee treatment. The *t*-statistics are computed using standard errors robust to heteroscedasticity and clustered on the firm (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The Appendix provides detailed descriptions of the variables.

To test this possibility, we re-estimate a difference-in-differences regression model as in Table 7 for two subsamples based on the firm-level exposures to the COVID-19 pandemic. We define high (low) COVID-exposure firms as those in the top (bottom) quartiles of the sample distribution and report the results for these tests in Table 8.

Table 8's results suggest that the effect of managerial competency on corporate outcomes during the COVID-19 pandemic is more pronounced among firms that are more exposed to the pandemic. For example, in models (1) and (2) of Table 8, among high-COVID-19 exposed firms, the change in firm risk, as measured by the volatility of its stock returns (*RETVOL*), with high pre-COVID-19 managerial ability scores (i.e., *HIGH_MASCORE* =

Table 7
Difference-in-difference regressions for corporate outcomes.

	RETVOL (1)	*ROA* (2)	*Tobin's Q* (3)	*DTD* (4)
HIGH_MASCORE × COVID19	−0.0018***	0.0075**	0.2992***	0.2847**
	(−2.77)	(2.12)	(3.44)	(3.25)
Control variables	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
S.E. clustered by firm & quarter	Yes	Yes	Yes	Yes
Adjusted R-squared	0.510	0.289	0.325	0.706
Observations	8,237	8,108	8,110	7,502

The table reports the results of difference-in-difference estimation for corporate outcomes over the last two quarters of 2019 and the first two quarters of 2020. *HIGH_MASCORE* is a dummy variable that takes the value of 1 if a firm's *MA_SCORE* score in 2018 is above the sample median and zero otherwise. *COVID19* is a dummy variable that takes the value of 1 for the first two quarters of 2020 and zero otherwise. Corporate outcomes include (i) stock return volatility (*RETVOL*), (ii) operating performance measures (i.e., Tobin's Q and return-on-assets (*ROA*)), and (iii) default risk, proxied by Merton (1974)'s distance-to-default measure (*DTD*). Control variables are similar to controls in the baseline models in Table 2 (for *RETVOL*), Table 3 (for *ROA* and *Tobin's Q*), and Table 4 (for *DTD*). Industry and quarter fixed effects are included in all models. The *t*-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The Appendix provides detailed descriptions of the variables.

1), compared to the change in *RETVOL* of other firms, is −0.005 (*t*-statistics of −3.35) lower in the first two quarters of 2020, whereas, this change in *RETVOL* among firms in low-COVID-19 exposure is −0.001 (*t*-statistics of −0.54).

We further employ the seemingly unrelated regressions (SUR) and the Wald test for the coefficient differences across different subsamples (e.g., Bonsall IV et al., 2017; Pham et al., 2022).[19] Overall, we find that compared to their counterparts with low managerial competency, firms with high managerial ability exhibit higher operating performance, lower firm risk, and lower default risk during the COVID-19 pandemic, and the relation is stronger among firms that are more exposed to the pandemic.

4.8. Additional analyses

In this section, we further consider several alternative explanations to ensure that our documented findings are not driven by other firm qualities. First, we control for corporate social responsibility ratings as Albuquerque et al. (2020) and Ding et al. (2021) suggest that environmental and social ratings are positively associated with firm resilience during the pandemic. We source the environmental, social, and governance scores (*ESG*) from the Sustainalytics database and use the average value of *ESG* scores over the pre-COVID period (2009–2018) to capture corporate social responsibility ratings. Second, we control for board quality measures as they can affect firm performance. We follow Weisbach (1988) and Dahya et al. (2008) and use board size and the proportion of independent directors on the board as proxies for board quality. We construct these board quality measures using data from the ISS/RiskMetrics database. Third and fourth, we consider external monitoring roles from analyst coverage and institutional investors as Bhojraj and Sengupta (2003) and Cheng and Subramanyam (2008) find they can be related to a firm's creditworthiness. We source analyst coverage data from the I/B/E/S data and institutional ownership data from Thomson Reuters Institutional Holdings (13F) Database. In each model (Models 1 to 4), we augment our baseline models for basic corporate outcomes (as in Tables 2, 3, and 4) with each of the above

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[19] We thank the referee for suggesting this test.

Table 8
Managerial ability, firm-level COVID exposure, and corporate outcomes.

	Firm-level COVID exposure		Firm-level COVID exposure		Firm-level COVID exposure		Firm-level COVID exposure	
	High	Low	High	Low	High	Low	High	Low
	RETVOL (1)	RETVOL (2)	ROA (3)	ROA (4)	Tobin's Q (5)	Tobin's Q (6)	DTD (7)	DTD (8)
HIGH_ MASCORE × COVID19	−0.005***	−0.001	0.070***	0.038***	0.235*	0.098	0.420***	0.162*
	(−3.35)	(−0.54)	(4.11)	(3.04)	(1.87)	(0.82)	(4.08)	(1.75)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S.E. clustered by firm & quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.532	0.585	0.535	0.452	0.235	0.460	0.704	0.703
SUR & Wald Test for differences in coefficients:								
χ^2 Test	5.90**		6.58***		4.64**		3.15*	
p-value	(0.02)		(0.01)		(0.03)		(0.07)	

The table reports the results of the impact of managerial ability on corporate outcomes across two subsamples: high versus low firm-level COVID exposure samples. We employ the firm-specific exposure to the COVID-19 pandemic over the first two quarters of 2020, measured as the frequency of keywords related to the COVID-19 extracted from the earnings call transcripts developed by Hassan et al. (2020). We define high (low) COVID-exposure firms as those in the top (bottom) quartiles of the sample distribution. We estimate a difference-in-differences regression model as in Table 6 for two subsamples. HIGH_MASCORE is a dummy variable that takes the value of 1 if a firm's MA_SCORE score in 2018 is above the sample median and zero otherwise. COVID19 is a dummy variable that takes the value of 1 for the first two quarters of 2020 and zero otherwise. Corporate outcomes include (i) stock return volatility (RETVOL), (ii) operating performance measures (i.e., Tobin's Q and return-on-assets (ROA)), and (iii) default risk, proxied by distance-to-default measure (DTD). Control variables are similar to controls in the baseline models in Table 2 (for RETVOL), Table 3 (for ROA and Tobin's Q), and Table 4 (for DTD). Industry and quarter fixed effects are included in all models. The t-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The Appendix provides detailed descriptions of the variables.

Table 9
Control for alternative explanations.

	MA_IND_ADJ		Adj.R^2	N.obs
	coeff.	t-stat		
Panel A: Stock return volatility as a dependent variable				
(1) Control for ESG ratings	−0.0012**	(−2.46)	0.328	2,526
(2) Control for board quality	−0.0015**	(−2.32)	0.425	1,615
(3) Control for analyst coverage	−0.0010**	(−2.38)	0.309	4,113
(4) Control for institutional ownership	−0.0014***	(−3.77)	0.307	4,114
(5) All alternative explanations	−0.0013***	(−2.09)	0.433	1,498
Panel B: Operating performance as a dependent variable				
(6) Operating profit margin as an alternative measure	3.3107***	(2.59)	0.126	4,440
(7) Asset turnover as an alternative measure	0.0340***	(9.92)	0.394	4,471
(8) Control for CSR ratings	0.2620***	(6.36)	0.357	2,793
(9) Control for board quality	0.2028***	(4.56)	0.347	1,804
(10) Control for analyst coverage	0.1327***	(2.79)	0.333	3,153
(11) Control for institutional ownership	0.1958***	(4.05)	0.314	3,153
(12) All alternative explanations	0.1528***	(2.99)	0.410	1,171
Panel C: Distance-to-default as a dependent variable				
(13) Control for CSR ratings	0.4738***	(5.35)	0.647	2,488
(14) Control for board quality	0.3887***	(3.85)	0.665	1,591
(15) Control for analyst coverage	0.2398***	(3.03)	0.650	3,580
(16) Control for institutional ownership	0.3218***	(4.33)	0.635	3,984
(17) All alternative explanations	0.3091***	(3.54)	0.675	1,442

The reports the results of regressions of corporate outcomes over the first two quarters of 2020 on firm-level managerial ability scores after controlling for alternative explanations. We control for (i) corporate social responsibility ratings (CSR), (ii) board quality proxied by board size and the proportion of independent directors on the board, (iii) analyst coverage, and (iv) institutional ownership. ESG rating data are from Sustainalytics. Analyst coverage data is from the I/B/E/S data. Institutional ownership data is obtained from Thomson Reuters Institutional Holdings (13F) Database. Board quality measures are sourced from the ISS/RiskMetrics database. For brevity, we report the coefficients on the industry-adjusted managerial ability score (MA_IND_ADJ). Panels A, B, and C report the regression results for stock return volatility, operating performance proxied by Tobin's Q, and distance-to-default measure, respectively. Industry and quarter fixed effects are included in all models. The t-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

alternative explanations individually. In Model (5), we include all alternative explanations in our regressions. Panels A, B, and C of Table 9 report the regression results for stock return volatility, operating performance proxied by Tobin's Q, and distance-to-default measure, respectively.[20] Collectively, Table 9's findings

suggest that managerial ability has a direct and significant effect on a firm's basic outcomes during the COVID-19 pandemic, independent of the effects of corporate social responsibility ratings, board quality, or external monitoring roles from financial analysts and institutional investors.

Motivated by an extant literature on how top executives affect their firms' outcomes, we further account for the impact of CEO characteristics on corporate outcomes. To ensure that the effects of able managers on corporate performance during the pandemic

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[20] For brevity, we report the coefficients on the industry-adjusted managerial ability score (MA_IND_ADJ) in Table 9. The results when alternative measures of managerial ability scores are employed are robust and are upon request.

Table 10
Control for CEO characteristics.

	RETVOL (1)	ROA (2)	Tobin's Q (3)	DTD (4)
MASCORE	−0.0080**	0.1184***	1.3751***	2.6659***
	(−1.97)	(3.93)	(2.74)	(4.34)
Control for CEO characteristics	Yes	Yes	Yes	Yes
Other controls as in baseline models	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
S.E. clustered by firm & quarter	Yes	Yes	Yes	Yes
Adjusted R-squared	0.3839	0.2050	0.3193	0.6639
Observations	1,999	2,156	2,156	1,905

The reports the results of regressions of corporate outcomes over the first two quarters of 2020 on firm-level managerial ability scores after controlling for CEO characteristics. CEO characteristics include CEO age, tenure, and gender, constructed from ExecuComp database. Corporate outcomes include (i) stock return volatility (*RETVOL*), (ii) operating performance measures (i.e., Tobin's Q and return-on-assets (*ROA*)), and (iii) default risk, proxied by distance-to-default measure (*DTD*). *MA_SCORE* is the managerial ability score in 2018, measured following Demerjian et al. (2012). Control variables are similar to controls in the baseline models in Table 2 (for *RETVOL*), Table 3 (for *ROA* and *Tobin's Q*), and Table 4 (for *DTD*). Industry and quarter fixed effects are included in all models. Industry and quarter fixed effects are included in all models. The *t*-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

are not driven by other CEOs' attributes, we conduct additional analyses and source CEO characteristics data from the ExecuComp database. We re-estimate our baseline models and further control for CEO characteristics, including CEO age, tenure, and gender, constructed from the ExecuComp database. We report the results for these tests in Table 10. Overall, we consistently observe that managerial ability has a direct and significant effect on a firm's basic outcomes during the COVID-19 pandemic.

4.9. Managerial ability and stock liquidity in the pandemic

Stock liquidity is one of the key aspects of financial markets and has strong implications for various corporate and market outcomes (e.g., (Levine and Zervos, 1998; Chordia et al., 2008; Fang et al., 2009; Næs et al., 2011; Fang et al., 2014)). A stock's liquidity costs also capture the level of investors' trust in a certain stock given trust underlies investment decisions in the stock markets (Guiso et al., 2008; Georgarakos and Pasini, 2011). We, therefore, examine how managerial ability affects the liquidity costs of the firms that they manage during the COVID-19 pandemic. We follow the market microstructure literature (e.g., Goyenko, Holden, and Trzcinka, 2009) and use Amihud (2002)'s price impact ratio as our measure of stock liquidity. As Goyenko et al. (2009) and Fong et al. (2017) note, Amihud (2002)'s ratio is the best cost-per-dollar volume measure. We follow Amihud (2002) and measure Amihud's price impact ratio as:

$$Amihud's\,ratio_{i,y} = T_y^{-1} \sum \frac{|r_{i,t,y}|}{vol_{i,t,y}}, \qquad (6)$$

where r is the return, *vol* is the dollar volume of stock i on day t in quarter y, and T is the number of trading days in quarter y. A higher Amihud ratio indicates more illiquidity. Since the raw Amihud measure is highly skewed, we follow Edmans et al. (2013) and take the natural logarithm of Amihud's price impact ratio for normalization and multiply it by -1 (denoted as *INVERSE_AMIHUD*) so that higher values of *INVERSE_AMIHUD* indicate higher levels of liquidity, and vice versa.

We also consider a liquidity measure that is industries-adjusted and therefore comparable among firms across industries. The industry-adjusted liquidity (*LIQUIDITY_IND_ADJ*) is measured as the difference between individual firm *INVERSE_AMIHUD* and industry mean liquidity, scaled by industry standard deviation of the liquidity measure.

In our univariate analysis, consistent with previous sections, we sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio stock liquidity in the first two quarters of 2020 by taking the average of the liquidity measure across all stocks in the portfolios. We report the descriptive statistics for the average stock liquidity across managerial ability sorted portfolios in Panel A of Table 11. We find firms led by more able managers have higher stock market liquidity. The (5–1) row reports the average stock liquidity difference between the low and high managerial ability groups. These univariate results in Panel A suggest a positive relation between managerial ability and stock liquidity at the univariate level.

We then further examine the impact of managerial ability on stock liquidity by employing a regression framework where we can control for firm-specific characteristics and time-invariant factors at the same time. We use the following regression:

$$LIQUIDITY_{i,t} = f(MA_{i,t-1}, CONTROL_{i,t-1}, FEs), \qquad (7)$$

where *LIQUIDITY* refers to two measures of liquidity (*INVERSE_AMIHUD*, *LIQUIDITY_IND_ADJ*) over the first and second quarter of 2020; *MA* refers to two measures of managerial ability (*MA_SCORE* and *MA_IND_ADJ*); *CONTROL* refers to firm-level control variables that can be related to a firm's liquidity costs as suggested by the literature (e.g., (Kale and Loon, 2011; Pham, 2020)), and *FEs* refer to industry-fixed effects and quarter-fixed effects. We include quarter-fixed effects and industry-fixed effects to control for time- and industry-invariant factors that could be associated with a firm's operating performance and use robust standard errors clustered simultaneously by both firm and quarter dimensions (Petersen, 2009; Gow et al., 2010; Thompson, 2011).

We present regression results for stock liquidity in Panels B of Table 11. Table 11 Panel B and Table A.5 in the Appendix present the results for Amihud liquidity and industries-adjusted liquidity measures, respectively. Across different model specifications, without firm controls (models 1 and 3) and with all controls (models 2 and 4), we consistently find that the coefficient estimates on all managerial ability measures are positive and statistically significant. The results suggest that firms led by more able management have higher stock liquidity or lower liquidity costs during the COVID-19 pandemic. In model (4), when the industry-adjusted managerial ability score increases by one standard deviation, it translates to a 11% (= 0.995 × 0.111) increase in liquidity. The effect is, therefore, both statistically and economically significant.

Table 11
Managerial ability and stock liquidity during the pandemic.

Panel A: Univariate analysis

Managerial ability	INVERSE_AMIHUD		LIQUIDTY_IND_ADJ	
	(1) MA_SCORE	(2) MA_IND_ADJ	(3) MA_SCORE	(4) MA_IND_ADJ
1 (Low)	18.9508	18.8261	0.0165	−0.0328
2	18.4696	18.4403	−0.1725	−0.1801
3	18.2062	18.3974	−0.2715	−0.1967
4	18.6326	18.7884	−0.1016	−0.0520
5 (High)	20.4535	20.2604	0.5301	0.4626
5 - 1	1.5028***	1.4343***	0.5137***	0.4954***
t-statistic	(11.97)	(10.64)	(11.99)	(10.80)

Panel B: Regression analysis

	Dependent Variable: INVERSE AMIHUD			
	(1)	(2)	(3)	(4)
MA_SCORE	3.992***	0.532***		
	(10.32)	(2.72)		
MA_IND_ADJ			0.621***	0.111***
			(10.00)	(3.30)
LNSIZE		1.336***		1.334***
		(32.75)		(32.81)
LEVERAGE		−0.589**		−0.590**
		(−2.44)		(−2.46)
BTM		0.046***		0.046***
		(9.08)		(9.13)
TANGIBILITY		12.857**		12.568**
		(2.57)		(2.51)
CASH		2.467***		2.430***
		(12.04)		(11.80)
ROE		0.059		0.059
		(1.47)		(1.49)
DIVIDEND_YIELD		−5.352***		−5.539***
		(−3.06)		(−3.15)
ADVERTISING		6.550***		6.458***
		(5.46)		(5.38)
Industry fixed effect	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.072	0.759	0.067	0.760
Observations	4,112	4,112	4,112	4,112

Panel A of the table reports the distribution of stock liquidity by managerial ability quintile groups. We sort stocks into quintile portfolios based on their pre-COVID managerial ability scores and then compute the portfolio liquidity in the first two quarters of 2020 by taking the average of the stock liquidity across all stocks in the portfolios. The *5-1* measure row reports the average stock liquidity difference between the low and high managerial ability groups. Panel B of the table reports the results of regressions of the stock liquidity over the first two quarters of 2020 on firm-level managerial ability scores under several model specifications: without firm controls (models 1 and 3) and with all controls (models 2 and 4). *MA_SCORE* is the average managerial ability score in 2018, measured following Demerjian et al. (2012). *MA_IND_ADJ* is the industry-adjusted managerial ability score. *INVERSE_AMIHUD* is the inverse of the logarithm of Amihud's (2002) illiquidity measure, measured over each quarter of 2020. *LIQUIDTY_IND_ADJ* is the industry-adjusted liquidity measure. Industry and quarter fixed effects are included in all models. The *t*-statistics are computed using standard errors robust to heteroscedasticity and clustered simultaneously on the firm and quarter dimensions (Petersen, 2009; Gow et al., 2010). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed descriptions of the variables.

4.10. Managerial ability, employment and operation related violations

So as to conduct a complete investigation of the roles of managerial competency on corporate outcomes during the COVID-19 pandemic, we further examine whether the pre-COVID managerial competency qualities influence a firm's likelihood of encountering employment- and operation-related violations amid the pandemic. The COVID-19 outbreak and the pandemic-induced economic turmoil have accelerated concerns regarding workplace safety, employees' health care, and lay-off. Results from a recent global survey suggest that when the COVID-19 health disaster strikes and its-induced economic turmoil escalates, corporate

Table 12
Managerial ability, employment, and operation related violations.

	Dependent Variable: VIOLATION_DUMMY	
	(1)	(2)
HIGH_MASCORE	−0.7810***	−0.5588**
	(−3.26)	(−2.17)
LNSALE	0.9015***	0.8810***
	(11.77)	(9.83)
LEVERAGE	0.1852	−0.0757
	(0.36)	(−0.14)
BTM	−0.0006	0.0056
	(−0.04)	(0.38)
TANGIBILITY	−86.9869	−154.5777
	(−0.94)	(−1.12)
Industry fixed effects	No	Yes
Pseudo R-squared	0.258	0.295
Observations	2,125	2,125

The reports the results of logit regressions of employment and operation related violations over the first two quarters of 2020 on firm-level managerial ability scores in the pre-COVID year. We consider a number of employment and operation related violations from Violation Tracker, including employment-related violations, safety-related violations, health care related violation, and consumer protection related violations. Our dependent variable is a dummy variable, *VIOLATION_DUMMY*, that takes the value of 1 if a firm experiences any of the mention-above violations in the first two quarters of 2020 and 0 otherwise. *HIGH_MASCORE* is a dummy variable that takes the value of 1 if a firm's *MA_SCORE* score in 2018 is above the sample median and zero otherwise. The *t*-statistics based on standard errors robust to heteroscedasticity and clustered by firm are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

managers are expected to lead from the front in times of crisis (Edelman, 2020). We conjecture that more able managers can develop strategies and operational effectiveness to preserve jobs, maintain employees' payroll, and ensure workplace safety and healthcare benefits that help firms better navigate in adverse and unexpected business conditions. Firms led by more able managers, therefore, should be less likely to encounter employment- and operation-related offenses amid the pandemic.

To facilitate this analysis, we collect a number of employment- and operation-related violations from Violation Tracker, including employment-related violations, safety-related violations, health care related violation, and consumer protection related violations.[21] Our dependent variable of interest is a dummy variable, *VIOLATION_DUMMY*, that takes the value of 1 if a firm experiences any of the mention-above violations in the first two quarters of 2020 and 0 otherwise. We run the following logit model to examine whether pre-COVID managerial competency qualities influence a firm's likelihood of encountering these violations in times of crisis.

$$VIOLATION\_DUMMY = f(HIGH\_MASCORE, CONTROL, FE), \quad (8)$$

where *VIOLATION_DUMMY* is an indicator indicating whether a firm exhibits any employment and operation related offenses over the first two quarters of 2020; *HIGH_MASCORE* is a dummy variable that takes the value of 1 if a firm's *MA_SCORE* score in 2018 is above the sample median and zero otherwise. We include a number of firm-level control variables that can be related to a firm's capacity to maintain its operation and cash flows in times of crisis, including the logarithm of firms' total sales, leverage ratio, book-to-market ratio, and the ratio of tangible assets to total assets. We also include industry fixed effects to account for industry-invariant factors that could be associated with employment and operation violations.

We report the results for this test in Table 12. Overall, Table 12's results suggest that firms led by highly competent

[21] Violation Tracker is available at: https://www.goodjobsfirst.org/violation-tracker.

Table A.1

The table reports variable decriptions.

Variables	Descriptions	Source
Managerial ability measures		
MA_SCORE	The average managerial ability scores in 2018, measured following Demerjian et al. (2012).	Demerjian et al. (2012)
MA_IND_ADJ	The industry-adjusted managerial ability score, measured as the difference between individual firm *MA_SCORE* and industry mean *MA_SCORE*, scaled by industry standard deviation of *MA_SCORE*.	Fama–French 48 industries classification; authors' estimation
HIGH_MASCORE	A dummy variable that takes the value of 1 if a firm's *MA_SCORE* scores above the sample median and zero otherwise	Demerjian et al. (2012); authors' estimation
Corporate outcomes		
ROA	Return on assets, defined as the operating income before depreciation over book assets during the first and second quarter of 2020.	Compustat Quarterly
RETVOL	Stock return volatility, measured as the standard deviation of daily stock raw returns during the first and second quarter of 2020.	CRSP
RETVOL_MKTADJ	Stock return volatility based on market-adjusted returns, defined as the difference between a stock's raw returns (*RET*) and value-weighed market returns from CRSP (*VWRETD*).	CRSP
PROFIT_MARGIN	Operating profit margin, measured as the operating income before depreciation over total sales during the first and second quarter of 2020.	Compustat Quarterly
TOBIN'S Q	Tobin's Q ratio during the first and second quarter of 2020, defined as the ratio of book assets minus book equity plus market value of equity over book assets.	Compustat Quarterly
DTD	Merton (1974)'s distance-to-default measure, estimated following Bharath and Shumway (2008).	CRSP, Compustat Quarterly
DTD_IND_ADJ	The industry-adjusted distance-to-default measure.	CRSP; Compustat Quarterly; Fama–French 48 industries classification
VIOLATION_DUMMY	A dummy variable that takes the value of 1 if a firm experiences any employment-related violations, safety-related violations, healthcare related violation, and consumer protection related violations in the first two quarters of 2020 and 0 otherwise.	Violation Tracker
Firm characteristics		
LN_SIZE	The logarithm of firm size measured by total assets in 2019.	Compustat Annual
LEVERAGE	Leverage ratio, defined as the ratio of total debt to book assets in 2019.	Compustat Annual
BTM	Book to market ratio, measured as the ratio of the book value of equity over the market capitalization value in 2019.	Compustat Annual
ROE	Return on equity, defined as the net income over book equity in 2019.	Compustat Annual
ROA	Return on assets, defined as the operating income before depreciation over book assets during the first and second quarter of 2020.	Compustat Quarterly
DIVIDEND_YIELD	Dividend per share over stock price in 2019.	Compustat Annual
ADVERTISING	Advertising expenditures over book assets in 2019. Missing values are set to zero.	Compustat Annual
LN_SALE	The logarithm of total sales in 2019.	Compustat Annual
INVERSE_AMIHUD	The inverse of the logarithm of the Amihud's (2002) illiquidity measure. The quarter Amihud measure is calculated as the average of daily Amihud price impact ratio over all trading days during the first and second quarters of 2020.	CRSP
AMIHUD_IND_ADJ	The industry-adjusted liquidity, measured as the difference between individual firm's Amihud measure and industry mean of the measure, scaled by industry standard deviation of the liquidity measure.	CRSP; Fama–French 48 industries classification
COVID19	A dummy variable that takes the value of 1 for the first two quarters of 2020 and zero otherwise.	Authors' estimation

management are less likely to exhibit employment and operation related offenses in times of crisis such as the COVID-19 outbreak. Collectively, we find consistent evidence that managerial competence plays significant roles in shaping corporate resilience amid the pandemic.

5. Conclusions

'*No previous infectious disease outbreak, including the Spanish Flu, has affected the stock market as forcefully as the COVID-19 pandemic*' (Baker et al., 2020). The COVID-19 pandemic has rapidly reverberated across the U.S. and left unprecedented economic damages in the form of record productivity losses, surging redundancies, and massive asset valuation destruction. Our study investigates whether managerial ability contributes to the resiliency of firm performance during the pandemic period based on the notion that management leadership is more important than ever in paving the way for corporate America to get through the COVID-19 crisis.

Using a large dataset of U.S. publicly listed firms, we find that firms with higher managerial ability exhibit lower stock return volatility, higher operating performance, and higher stock liquidity over the first two quarters of 2020 when the pandemic strikes. We also find that firms with high managerial ability show significantly lower levels of default risk during the pandemic. The relation between managerial ability and firm performance is especially stronger when we assess firm performance during the pandemic period than during the pre-pandemic period. These findings highlight the value of management ability in a crisis.

Our study has explicit implications for future research avenues and policy formulation. Research findings in this study suggest managerial ability is an important contributing factor to resiliency, with the effect translating into several superior measures of firm performance. Future research should investigate whether managerial ability also affects assessments of firms by other market participants such as financial analysts, debt capital providers, and external auditors.[22] In addition, the exogenous nature of the COVID-19 outbreak presents a valuable setting to re-examine and elicit if certain desired qualities of management manifest their expected impacts on firms during the pandemic.[23]

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data are available from the sources identified in the paper.

Appendix A. Variable definitions

See Table A.1.

Appendix B. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jbef.2022.100781.

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[22] For example, De Vito and Gomez (2020) report that firms face a severe liquidity crunch during the COVID-19 pandemic and many firms are in need of immediate access to capital provision. It is important to know if managerial ability plays its role in mitigating this liquidity risk.

[23] A growing stream of research (e.g., Bamber et al. (2010); Dyreng et al. (2010); Ahmed and Duellman (2013); Law and Mills (2017) links idiosyncratic personality traits of managers to their firms' accounting choices, financial strategies, and corporate disclosures. Common among these studies is the notion that managers not only directly drive corporate strategies but also set the "tone at the top".

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