

How Corporate Liquidity Reacts to COVID-19 Outbreak? Evidence from Listed Corporations in Saudi Arabia

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Abstract

The outbreak of the COVID-19 pandemic remarkably influenced the global economy and hence corporate decisions. This study investigates corporate liquidity policy reaction to the COVID-19 pandemic by comparing corporate cash holdings levels before and after the COVID-19 crisis. Using quarterly data of listed non-financial firms in Saudi Arabia over the years 2018-2021 and employing a paired-sample univariate analysis, this study found that the COVID-19 outbreak significantly influenced corporate liquidity decisions. In particular, the results show a significant difference in the cash holdings levels between the periods before and after the COVID-19 crisis. Firms' cash holdings are significantly higher after COVID-19 in comparison to cash holdings before the pandemic. These findings support the trade-off theory's precautionary and transaction cost motives for holding liquid assets. The outcomes of this study provide important implications for policymakers, corporate managers, and lenders.

Keywords: corporate liquidity policy, cash holdings, COVID-19, Saudi Arabia

1. Introduction

The outbreak of the recent COVID-19 pandemic severely influenced the global economy and brought remarkable uncertainty. At the corporate level, the COVID-19 pandemic affected firm's assets management, bankruptcy risk, stock prices and cash holdings decisions. Accordingly, finance researchers become motivated to investigate how alternative corporate financial decisions are re-shaped during the outbreak of COVID-19 (e.g., Cowling et al., 2020; De Vito & Gómez, 2020; Hoang et al., 2022; Ntantamis & Zhou, 2022; Qin et al., 2021; Sutrisno, 2021; Xu & Jin, 2022; Zheng, 2022).

An efficient corporate liquidity policy is vital for firms' value creation due to its link to firms' profit, and risk. Existing corporate cash holdings studies confirmed the significance of firms' cash management during times of several economic uncertainties, such as the recent COVID-19 outbreak (Alnori, 2023; Bugshan et al., 2022; Cook & Tang, 2010). There is a growing strand of corporate financing literature focused on studying the influence of the recent COVID-19 crisis on firms' cash holdings decisions (Ntantamis & Zhou, 2022; Qin et al., 2021; Sutrisno, 2021; Xu & Jin, 2022; Zheng, 2022).

Existing corporate cash holdings literature did not investigate how corporate liquidity management reacts to the COVID-19 pandemic using a sample representing non-financial firms operating in Saudi Arabia. This is because most available studies on the effect of the COVID-19 pandemic on cash holdings are performed in other countries including China (Xu & Jin, 2022), Indonesia (Sutrisno, 2021), and the UK (Cowling et al., 2020). Since these studies did not apply their research questions to Saudi Arabian-listed firms, these studies' implications may not apply to local firms, regulators and policymakers. Therefore, the main objective of the current study is to contribute to the existing body of knowledge by investigating the impact of the recent COVID-19 crisis on firms' cash holdings decisions located in Saudi Arabia.

Saudi Arabia is a significant economy worldwide being a G20 and the largest exporter of raw oil (Almaafi et al., 2023; Alnori & Ahmed, 2022; Alnori, 2020; Alnori & Alqhtani, 2019). In terms of the capital market, the main stock exchange in Saudi Arabia (TASI) is the largest in the Middle East and North Africa region (MENA). The policymakers in Saudi Arabia achieved impressive reforms in the capital market involving the liberalization of the capital market for international investors. Consequently, FTSE index providers ranked the Saudi market as

emerging market status. Therefore, research on Saudi firms' cash holdings decisions during the COVID-19 outbreak is important.

The findings of this study demonstrate that the COVID-19 outbreak significantly influences firms' cash holdings decisions. Specifically, there is a significant difference in the cash holding level before and after the COVID-19 crisis. In particular, the level of firms' cash holdings post-COVID-19 is significantly higher in comparison to the level of firms' cash holdings before the COVID-19 pandemic. This higher level of cash holdings after the outbreak of COVID-19 is attributed to the view that firms are expected to increase their cash reserves to avoid the need for costly and less available external financing during times of high uncertainty in the economy. These findings are consistent with the trade-off theory's precautionary and transaction cost motives for holding liquid assets.

The remainder of this study proceeds as follows: Section 2 is the theoretical overview, and Section 3 presents the relevant literature and the hypothesis development. Section 4 provides the data and research method; Section 5 presents the results and Section 6 concludes the study.

2. Theoretical Overview

The theoretical literature on corporate liquidity developed three influential theories explaining corporate liquidity including the trade-off, pecking order and free cash flows theories. The trade-off theory predicts that firms follow a target cash holding level that balances between the advantages (the transaction cost and the precautionary motive) and the disadvantages (agency cost and cost of carrying) of holding liquid assets. Looking specifically at the benefits of corporate liquidity, the transaction cost-saving advantages assume that sufficient liquidity enables firms to use the cheaper internal fund and hence avoid the transaction cost of costly external financing (Alnori, 2020; Opler et al., 1999). Further, the precautionary advantages of holding cash posts that firms' liquidity enable corporations to invest in positive net present value projects (NPV) during times of lower supply of external funds in the economy (Dittmar et al., 2003).

On the other hand, and as mentioned, the agency cost and the cost of carrying are two disadvantages of holding liquid assets, as described by the trade-off theory (Opler et al., 1999). Holding a large amount of cash may indicate an agency problem since corporate managers may avoid investing in profitable projects and focus on holding cash, which is not in line with the objective of financial management which is maximizing shareholders' wealth. This is because holding cash results in achieving lower returns compared to investing in projects that are related to the firm's main operational activities (Ferreira & Vilela, 2004).

Myers (1984) and Myers and Majluf (1984) introduced the pecking order theory, which is based on the informational asymmetry associated with corporate financing decisions. In contrast to the trade-off theory, the pecking order theory posts that there is no optimal target for corporate cash holdings decisions. Instead, the pecking order theory posts that cash holdings choice should minimize the informational problem. More specifically, the firm should rely on internal funds (i.e. cash reserves) first since it has a lower informational cost. However, if the firm internal fund is not sufficient, firms should be financed by debt and equity issuance should be the final option for corporate financing (Alnori et al., 2022; Opler et al., 1999).

According to Jensen (1986), the free cash flow hypothesis predicts that corporate managers like to increase their control of the firm's assets by accumulating large cash reserves. This accumulation of cash enables firms' managers to have more discretionary power when making investment choices, which may make firms suffer from over-investment (Guizani, 2017). Therefore, the free cash flow theory predicts that holding larger liquid assets may reduce the pressure to manage the firm efficiently and may increase the agency problem since managers may choose projects that fit their own benefit.

3. Relevant Literature and Hypothesis Development

As a result of the COVID-19 outbreak, researchers become motivated to examine how such high uncertainty in the economic conditions may influence corporate decisions including liquidity policy. In this light, a growing strand of corporate cash holdings literature has begun to investigate how the Covid-19 pandemic may re-shape corporate cash and liquid assets (Cowling et al., 2020; De Vito & Gómez, 2020; Hoang et al., 2022; Ntantamis & Zhou, 2022; Qin et al., 2021; Sutrisno, 2021; Xu & Jin, 2022; Zheng, 2022).

Existing literature on cash holdings decisions during the COVID-19 crisis is generally divided into two dimensions. The first part of the existing studies looked at the influences of COVID-19 on firms' cash holding levels, while the second strand focused on the importance of firms' cash holdings on firms' alternative decisions during the COVID-19 outbreak. The current study aims to concentrate on the strand of the literature that investigates firms' cash holdings decisions during the COVID-19 outbreak. Overall, existing literature reports

competing evidence on the impact of COVID-19 on firms' cash holdings decisions.

Several studies demonstrate that corporate liquidity decision reacts significantly to the outbreak of COVID-19 by increasing firms' cash levels. For example, Qin et al. (2021) report that the COVID-19 outbreak severely impacted the global economy and hence listed firms. Following this thought, Qin et al. (2021) examined the impact of the COVID-19 pandemic on firms' cash holdings decisions. To examine the mentioned research question, Qin et al. (2021) employ a difference-in-difference approach to detect firms' cash holdings decisions during the COVID-19 period. The sample used in their study includes firms listed in the Shanghai and Shenzhen stock exchanges over the years 2014-2020. Qin et al. (2021) explored that firms' cash holdings reacted significantly to the outbreak of COVID-19. More specifically, firms increased their cash holdings because of the COVID-19 crisis.

Sutrisno (2021) performed one of the earliest studies on the linkage between COVID-19 and corporate liquidity decisions. More specifically, Sutrisno (2021) compared the cash holdings levels of firms before and after the COVID-19 outbreak to investigate the difference in firms' cash levels. Applying a period sample univariate analysis on a sample representing non-financial Indonesian corporations over the years 2019 and 2020, Sutrisno (2021) explored that COVID-19 importantly influences firms' cash holdings decisions. In particular, Sutrisno (2021) found that firms significantly increased their cash holdings levels post-COVID-19 in comparison to the pre-COVID-19 period. This higher level of cash is explained by the trade-off theory's precautionary and transaction cost motive of holding cash.

Zheng (2022) advances the existing literature by examining the important role of corporate cash management on firms' investment decisions during the COVID-19 crisis. Using Compustat quarterly data and employing difference-in-difference methodology, Zhen (2022) explored that cash holdings have an important influence on firms' investment decisions during the COVID-19 crisis. More specifically, Zheng (2022) demonstrates that firms with larger cash reserves are better able to make investment decisions during the COVID-19 crisis.

Several studies examined corporate cash holdings decisions during the COVID-19 pandemic using a sample of firms operating in different countries. For instance, Ntantamis and Zhou (2022) explored the role of firms' cash holdings on the financial decisions for firms' operations in the G-7 economies. Ntantamis and Zhou (2022) demonstrate that cash holdings enhance firms' ability to pay dividends during the COVID-19 period. However, this ability of firms' dividends varies across European and non-European corporations. Further, employing a sample consisting of Vietnamese corporations, Nguyen et al. (2021) found that cash holding is key for firms that are more influenced by the impact of COVID-19.

In contrast to the above-reviewed studies which report that firms increase their liquidity levels significantly due to the outbreak of COVID-19, several studies show that there is no significant effect of COVID-19 on firms' cash holdings decisions. For example, Xu and Jin (2022) investigate the impact of the Covid-19 pandemic on firms' cash-holding decisions. Using a sample representing Chinese firms operating in the agri-food industry over the years 2016-2021 and applying alternative panel data methods, Xu and Jin (2022) found that the COVID-19 outbreak did not significantly impact corporate cash holdings decisions. More specifically, the level of cash holdings and cash equivalents did not vary significantly before and post the COVID-19 outbreak. Further, Cowling et al. (2020) performed another study looking at the impact of the recent COVID-19 crisis on 1500 UK firms' cash holdings decisions. The result of Cowling et al. (2020) found that the majority of firms included in their study sample did not boost their cash levels during the period of the COVID-19 crisis. The implication of the study performed by Cowling et al. (2020) reinforces the importance of the precautionary motive of corporation liquidity.

After reviewing the existing literature on the nexus between the COVID-19 outbreak and corporate cash holdings decisions, it has been inferred that there is a relevant gap in the mentioned strand of corporate liquidity literature. More specifically, existing literature did not investigate the impact of COVID-19 on the cash holding decision, and hence the liquidity policy, for firms operating in Oil-driven economies, such as Saudi Arabia. Therefore, the current study's main objective is to offer an alternate perspective on studying the impact of the COVID-19 crisis on corporate liquidity by looking at listed firms in Saudi Arabia. The investigation of COVID-19's effect on corporate cash holdings for Saudi listed firms is important since Saudi Arabia is a substantial economy being one of the G20 and the largest capital market in the Middle East and North African region. (MENA).

3.1 Hypothesis

The central hypothesis of the current study predicts that corporate liquidity policy reacts to the outbreak of the COVID-19 pandemic in two different approaches. The first one is that firms may rely heavily on their internal

cash reserves to fund their operations during the COVID-19 crisis. This reliance on cash holdings is explained by the fact that external financing becomes more expensive and less available during times of poor economic conditions and high uncertainty in the global economy (Alnori, 2023; Bugshan et al., 2022; Cook & Tang, 2010; Korajczyk & Levy, 2003). However, since most existing studies, as reviewed above, did not report a negative impact of COVID-19 on firms' cash holdings levels, the current study expects that it is unlikely that firms operating in Saudi Arabia decreased the cash levels to react to the COVID-19 outbreak.

In contrast to the above-mentioned view, which predicts that firms' cash holdings levels should decrease during the COVID-19 in comparison to the pre-COVID-19 period, the opposite view is that firms are expected to increase their cash holdings levels during the COVID-19 crisis. According to Xu and Jin (2021) and Opler et al. (1999), corporate cash is essential for a firm's survival and key to its daily functions. Therefore, holding enough cash is important for firms during times of low supply of external funds in the economy to avoid the need for external financing (Bugshan et al., 2021; Cook & Tang, 2010). Further, similar to corporate experience during the global financial crisis in 2008, during the COVID-19 crisis, the availability of positive NPV projects became less and firms were more likely to avoid investment and prefer to keep the cash reserves due to the high uncertainty in the economy and higher risk of corporate default (Campello et al., 2010; Zaman et al., 2023). Therefore, following a similar line of thought, the current study hypothesis is that firms' cash holdings level, during COVID-19, is expected to be significantly different in comparison to the cash holdings level pre-COVID-19 outbreak. More specifically, cash holdings levels should be higher, during the COVID-19 period, in comparison to the pre-covid-19 outbreak.

The majority of existing empirical evidence mostly confirms that firms' cash holdings levels, during the COVID-19 period, are significantly higher than their cash levels pre-COVID-19 outbreak (e.g., Cowling et al., 2020; De Vito & Gómez, 2020; Hoang et al., 2022; Ntantamis & Zhou, 2022; Qin et al., 2021; Sutrisno, 2021; Xu & Jin, 2022; Zheng, 2022). In terms of finance theory, these studies, which demonstrated higher levels of cash holding during the COVID-19 crisis, justified these higher cash reserves for corporate liquidity policy to the trade-off theory precautionary and transaction cost motive for holding cash. Accordingly, due to the lack of research examining Saudi Arabian firms' liquidity policy reaction to the COVID-10 outbreak, and due to the higher cost of external financing during times of high economic uncertainty, the following hypothesis will be tested:

H₁: Saudi-listed corporations are expected to hold a larger amount of cash during the COVID-19 period in comparison to the pre-COVID-19 period.

4. Data and Research Methodology

4.1 Sample Selection

The original sample consists of all listed non-financial firms in the Saudi Arabian Main Stock Exchange (TASI). The data are quarterly constructed over the years 2018-2022. Most cash-holding-related data are obtained from Bloomberg. In line with prior corporate cash holdings studies (Alnori, 2020; Opler et al., 1999), financial firms (i.e. banks and insurance companies) are excluded from the study sample, since these firms' financial decisions are influenced by regulations and therefore not relatively driven by the market (Cook & Tang, 2010). Firms with missing data during the sample period are dropped from the sample. Further, to reduce the effect of extreme values, the data are winsorized at the 0.01 and 0.99 levels (Note 1) (Qin et al., 2021). Finally, after performing the mentioned data management and sample construction, 2084 observations for 985 firms remained in the sample.

4.2 Measuring Corporate Cash Holding

Existing literature considers corporate cash holdings as the key indicator for firms' liquidity (e.g., Alnori, 2020; Opler et al., 1999; Qin et al., 2021). Some studies defined corporate cash holding by dividend cash to operating income (e.g., Xu & Jin, 2022), while most studies define firms' cash holdings as the ratio of cash and cash equivalent scaled by net assets (Cuizani et al., 2023; Dittmar et al., 2003; Opler et al., 1999). Therefore, Following the majority of cash holdings studies, cash holding is measured according to the ratio of cash and cash equivalent divided by the firm's book value of net assets.

4.3 Defining COVID-19

Following relevant studies which examined the impact of the COVID-19 crisis on corporate cash holdings (Qin et al., 2021; Sutrisno, 2021; Xu & Jin, 2022; Zheng, 2022), the present study employs different measures to accurately defend the COVID-19 crisis. According to Xu and Jin (2022), this pandemic was first identified in December 2019 and it started to quickly spread in January 2020. Subsequently, this pandemic quickly influenced

the global economy and hence corporate decisions. Following Xu and Jin (2022) and Jin et al. (2021), the present study defined the COVID-19 period (COVID) as a dummy variable which takes the value of 1 for each quarter starting from 2020 to 2021 and zero otherwise (Note 2). Table 1 presents all variables used in the current study.

Table 1. Variable definition

Variable	Symbol	Measurement
Cash holding	CASH	Cash & Cash Equivalent / Total Assets
Pre-COVID-19 Pandemic	Pre-COVID-19	Years 2018 & 2019 quarters.
Post-COVID-19 Pandemic	Post-COVID-19	Years 2020 & 2021 quarters.

4.4 Methodology

To investigate the Saudi corporate liquidity policy reaction to the COVID-19 crisis, the current study compares firms' cash holdings levels between pre-COVID-19 and after the COVID-19 times. Following (Sutrisno, 2021), the present study performs a paired-sample t-test to examine the hypothesis of the study. This is achieved by comparing the mean values for corporate cash holding (i., measured by the variable CASH) between the pre-COVID and post-COVID-19 outbreak period. Further, since the main values may be influenced by outliers, the current study also performs the Rank-Sum test which compares the median values for firms' cash holdings between the pre-COVID-19 and after-COVID-19 periods.

5. Results

5.1 Descriptive Statistics

Table 2 presents the summary statistics for the cash holdings measure. As shown in Table 2, panel A shows the descriptive statistics for firms' cash holdings over the entire sample period. Table 2-panel B presents the descriptive statistics for cash holdings-related measures pre-the-COVID-19 outbreak, while panel B in Table 2 demonstrate the summary statistics for firms' cash holdings post-COVID-19.

Table 2 Panel A displays that the mean values for firms' cash holdings ratio, during the entire sample period, is 0.045. This mean value for cash holdings reveals that Saudi listed firms hold approximately 4.5% compared to their total assets as cash and cash equivalent. Further, the summary statistics shown in Table 2-panel A show that the standard deviation (STD) of firms' cash holdings is 0.11 indicating cross-sectional dispersion for firms' cash holdings at approximately 11%. Further, the difference between the maximum and minimum values for firms' cash holdings in the study sample is noticeably large indicating varying levels of liquid assets held across Saudi-listed corporations.

More importantly, the descriptive statistics reported in Table 2-panels B and C, which compare firms' cash holdings pre-COVID-19 and post-COVID-19, show remarkable differences between the mean values for firms' cash holdings. More specifically, the pre-COVID-19 mean value for firms' cash holdings is 0.037, while firms' mean cash holdings are 0.052 post-COVID-19. This indicates that post-COVID-19, the mean cash holding ratio for Saudi corporations is higher compared to Saudi firms' average cash holdings ratio before the outbreak of COVID-19. Similarly, the median values for firms' cash holdings ratio are higher post-COVID-19 compared to the prior COVID-19 crisis. Graphically, the mentioned higher cash holdings for Saudi firms post-COVID-19 compared to the pre-provide-19 period is demonstrated in Figure 1. These remarkable differences in the mean and median values for firms' cash holding between the pre-COVID-19 and post-COVID-19 give the current study a preliminary view of firms' liquidity policy reaction to the outbreak of COVID-19. Therefore, the next step in the current study is to examine whether significant statistical differences exist between the mean and median values across the mentioned two periods.

Table 2. Summary statistics

Table 2- Panel A Cash holdings summary statistic for the entire sample						
	Mean	Median	STD	MIN	MAX	N
CASH	0.045	0.01	0.116	0	0.691	985
Table 2- Panel B Cash holdings summary statistics for pre-COVID-19						
	Mean	Median	STD	MIN	MAX	N
CASH	0.037	0.009	0.101	0	0.691	458
Table 2- Panel C Cash holdings summary statistics for post-COVID-19						
	Mean	Median	STD	MIN	MAX	N
CASH	0.052	0.012	0.127	0	0.691	527

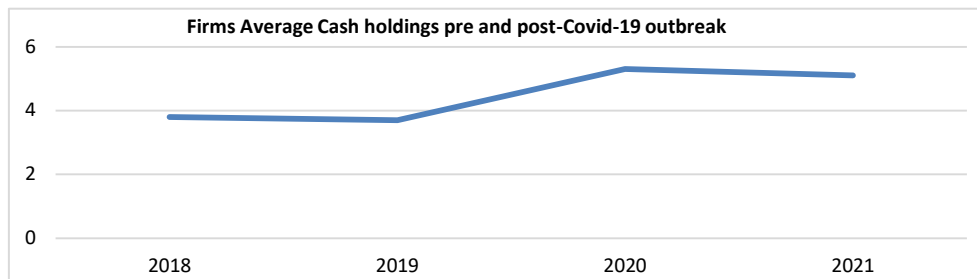


Figure 1. Firms' average cash holdings pre and post-COVID-19 outbreak

5.2 Univariate Analysis Results

Table 3 summarizes the results of the two tails t-test comparing corporate cash holdings levels across periods of the pre- and post-COVID-19 pandemic. As shown in Table 3, the cash holding ratio is significantly different between the pre-and post-COVID-19 outbreak. More specifically, the firms' cash holdings ratio is significantly higher during the post-COVID-19 pandemic than in the pre-COVID-19 pandemic at the 5% significance level. These findings confirm that the outbreak of COVID-19 importantly shaped firms' cash holdings decisions and hence firms' liquidity policy. This accepts the hypothesis that firms are expected to increase their cash reserves to avoid the need for costly and less available external financing during times of high uncertainty in the economy. Concerning financing theory, the present study findings are in line with the trade-off theory precautionary and transaction cost motive for holding cash and liquidity assets.

In relation to existing literature, the higher levels of cash holdings during the Covid-19 crisis are consistent with studies performed for firms listed in G7 countries, Indonesia, Compustat firms, and firms listed in the Shanghai and Shenzhen markets (Ntantamis and Zhou, 2022; Sutrisno, 2021; Qin et al., 2021; Zheng, 2022). In contrast, the findings of the current study, which reports higher cash holdings for listed Saudi firms during COVID-19, are inconsistent with prior studies using UK firms and firms operating in the agri-food industry in China (Cowling et al., 2020; Xu & Jin, 2020).

Table 3. Cash holdings level comparison between periods of the pre-and post-COVID Pandemic

	Mean	Mean Differences	Sig. (2-tailed)
Post-COVID-19	5.20%	0.7	0.026**
Pre-COVID-19	3.70%		

5.3 Robustness Check (Rank-Sum Univariate Test)

The main analysis in this study relies on the two-tailed t-test, which compares the difference in the mean values of cash holdings levels between periods of the pre- and post-COVID-19 pandemic. However, some studies report that the mean value can be largely influenced by outliers and extreme values since this central tendency measure is based on the value of the sample (Alnori & Alqhtani, 2019). Therefore, and for robustness purposes, the current study repeats the analysis performing the Wilcoxon Rank-Sum test, which investigates the median difference across firms' cash holdings pre- and post-COVID-19 outbreak. As shown in Table 4, the results indicate the median value for firms' cash holdings post-COVID-19 is significantly higher than the median value for firms' cash holding ratio pre-COVID-19. Therefore, the rank-sum test outcomes confirm the mean results reported in Table 3. Further, the current study also performs another robustness test, which is based on alternative measures for cash holdings (Note 3).

Table 4. Cash holdings level Comparison between periods of the pre-and post-COVID Pandemic using Rank-Sum Median Difference Test

	Median	Wilcoxon Rank-Sum Z
Post-COVID-19	0.012	0.048**
Pre-COVID-19	0.009	

6. Conclusion

This paper is motivated by the need to explore the influence of COVID-19 on Saudi Arabia-listed firms' liquidity

policy decisions. Thus, this study investigates the difference in the corporate liquidity policy by examining cash holdings levels of listed non-financing firms operating in Saudi Arabia during the COVID-19 outbreak. To answer the research question, this study performed univariate analysis (t-test and Rank-sum) to compare the difference in the cash holdings level of Saudi firms before and after the COVID-19 crisis. The findings of this study demonstrate that the COVID-19 outbreak importantly influences firms' cash holdings decisions. more specifically, there is a significant difference in the cash holding level before and after the COVID-19 crisis. In particular, the level of firms' cash holdings post-COVID-19 is significantly higher in comparison to the level of firms' cash holdings before the COVID-19 pandemic. This higher level of cash holdings after the outbreak of COVID-19 is attributed to the view that firms are expected to increase their cash reserves to avoid the need for costly and less available external financing during times of high uncertainty in the economy. These findings are consistent with the trade-off theory of precautionary and transaction cost motives for holding liquid assets.

Despite the limitations of this current study, several important recommendations and implications can be derived from the study findings. First, policymakers and central banks should collectively ease the supply of external financing sources to alleviate the negative impact of COVID-19. Therefore, creditors and lenders should increase credit support to lower the cost of external financing for firms. Second, corporate managers should be aware of the importance of holding their cash reserves, during times of higher economic uncertainty, to fund firms' working capital requirement and have enough internal financing sources for current obligations. Third, firms should adapt their business strategies appropriately considering economic conditions and avoid excessive risk to avoid being financially distressed. Fourth, the financing of this study informs managers about the importance of internal funds during times of COVID-19.

Finally, this study leads to interesting avenues for future research. Since the current study applied a univariate analysis, future research may expand the current study by performing multivariate analysis including control variables that are importantly relevant to corporate cash holdings decisions. Future research may also compare the effect of COVID-19 on petrochemical and non-petrochemical firms.

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Notes

Note 1. The current study also performs the analysis without winsorizing the data and still obtains similar results.

Note 2. Some studies defined the COVID-19 period from the second quarter of 2020 (e.g., Sutrisno, 2021). The current study analysis considers the definition starting from the mentioned period for robustness purposes. The results are still unchanged. Further, the present study also compared cash holdings levels separately over the years 2109, 2020 and 2021 and still report similar outcomes. The study also repeated the analysis after dropping the year 2021 and the findings are still unchanged.

Note 3. This measure is defined as cash and cash equivalent scaled by total assets. The results are still the same.

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