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Impacts of disease pandemics on corporate cash holdings: Evidence from US firms

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Abstract

Pandemic disease outbreaks generate economic disruptions and impact on liquidity needs of firms. However, how pandemics affect liquidity management policies of firms has received relatively little attention. In this study, we examine whether U.S. firms hold more cash during disease pandemics. We find that U.S. firms increase their cash holdings in response to high disease pandemic exposure. The increase is more pronounced for firms that are small, young, or highly exposed to the uncertainty through their greater reliance on government spending. However, expected cash holdings decrease significantly for firms with male CEOs, or more able (or specialist) CEOs who possess more specific rather than general knowledge of their business to make better judgements. In particular, holding more cash in the presence of high disease uncertainty alleviates the negative impact of disease pandemics on capital investment and corporate payout targets. Our findings demonstrate that cash holdings represent a vital channel in mitigating the negative effect of disease pandemics on firm strategic outcomes.

Keywords: *pandemic disease exposure, cash holding, government support, lobbying, dividend payout, firm investment.*

1. Introduction

Pandemics are large-scale outbreaks of infectious disease that results in increase morbidity and mortality over a wide geographic area and causes significant economic, social, and political disruption (Jamison, 2018). Recent evidence shows that the prospect of pandemics has risen during the past century due to increased global travel and integration, urbanization, changes in land use, and greater exploitation of the natural environment (Jones and others 2008; Fahlenbrach et al., 2020). During times of economic disruptions and challenges, firms' cash flows in the near term may drop by as much as 100%, while other fixed costs (such as employee compensation, rents and debt servicing), operating and financial leverage remain sticky (Acharya and Steffen, 2020). More especially, firms in industries such as retail, hotel and travel experience an immediate fall in cash flows and hence have an unusual high demand for liquidity during times of economic disruptions. Such declines in firms' real economic activity and information environment may create adverse long-term consequences for firms, investors, and eventually the economy (Alfaro et al., 2020; Schoenfeld, 2020). For instance, where firms simultaneously face adverse shocks to their profitability or earnings and the impacts are plausibly difficult to quantify, the uncertainties associated with firms' cash flows increase information asymmetry, making it more difficult to raise external capital (Halling et al., 2020). The behavioural literature also documents that uncertainties and pandemics increase firms' liquidity needs, particularly to meet their working capital requirements (Didier et al., 2021; Dessaint & Matray, 2017). Thus, highlighting the importance in understanding how pandemics affect cash holdings and financial policies of firms.

Disease pandemics are key exogenous shocks that affect firms, households, and governments by causing a sudden halt to some or all their revenue production activities (Fahlenbrach et al., 2020). Whilst the COVID-19 outbreak in 2019 has spurred an increased academic investigation on the effects of COVID-19 on diverse corporate outcomes (e.g., Aristei and Gallo, 2024;

Pagano & Zechner, 2022; Didier et al., 2021; Ellul et al., 2020), there remains a paucity of research on how corporate financial decisions respond to other pandemics - namely, SARS, MERS, H1N1[5], Ebola, and Zika. During a severe pandemic, every sector of an economy faces disruption, potentially resulting to scarcities, rapid increase in prices of goods/services, and economic stresses for households, businesses/corporations, and governments (Jamison, 2018). This dynamic was evident during the 2014 Ebola and Covid-19 pandemic where response costs surged, economic activity slowed, and quarantines diminished governments'/firms' capacity to generate sufficient revenue (Jonas, 2013). In most cases, the fear of association with others weakens labor force participation, increases workforce absenteeism and workplace closures, disrupts transportation, stimulates government closure of borders and restrictions on all entry, and encourages private firms/businesses to disrupt trade, travel, and/or commerce via employee turnover and cancellation of scheduled commercial flights and cargo shipments/services (Pettenuzzo et al., 2020; Belo et al., 2013; Jonas, 2013). Hence, a sustained and severe pandemic in the magnitude of the 2003 SARS or the 1918 influenza A virus (H1N1) may cause remarkable and lasting economic downturn. However, how firms respond to economic shocks and disruptions associated with pandemics, which could impact on firms' liquidity management policies and risk of insolvency (Pinkowitz et al., 2016; Klöckner, et al., 2023), is crucially less understood. This study, therefore, attempts to fill this gap in the literature by investigating whether firm managers change their cash holdings policy in response to higher exposure to pandemics and, if they do, whether and how such changes in cash holdings help mitigate the negative effect of pandemic exposure on firms' real economic activity.

Faced with extreme levels of uncertainty and sharp reductions in cash flows, many firms are forced to focus on preserving short-term capital to ensure their survival (Bates et al.,

[5] Severe Acute Respiratory Syndrome (SARS); Middle East Respiratory Syndrome (MERS) and the influenza A(H1N1) virus. See Piret & Boivin, (2021) for an overview of the emergence and spread of infectious diseases that occurred throughout history and were classified as pandemic.

2009; Chung et al., 2023). Driven by precautionary motives, firms tend to scramble for liquidity because of the high uncertainty as to when and how much economic activity might recover[6]. Specifically, by holding large amounts of cash, firms can cushion themselves against sudden cash flow problems. In this context, disease pandemics cause the premium on access to cash to rise sharply, consequently increasing the cost of paying dividends for highly affected firms. As such, while a strand of the literature suggests that the stock markets rewarded firms with access to liquidity during the Covid-19 pandemic (Acharya and Steffen, 2020), others suggest that firms with high pandemic exposure experienced larger stock price drops (Fahlenbrach et al., 2020) and consequently suspended dividend payments (Pettenuzzo et al., 2020). Key lessons from these studies suggest that, though pandemics affect almost all firms systemically, those with low liquidity or cash levels may suffer most. These studies do not, however, address how large, sudden shocks to firms' earnings prospects can impact their propensity to hold more cash during such uncertain periods, as we do.

To gain insights into how firms react to exposure to disease pandemics via their cash holding decisions, we examine the impact of pandemics on corporate cash holding. To capture a firm's exposure to pandemic diseases, we use the Hassan et al. (2019, 2020) general text-classification method which gauges the exposure of firms to an outbreak of an epidemic disease by counting the number of times the disease is mentioned in the quarterly earnings conference call that publicly listed firms host with financial analysts. We undertake the empirical analysis

[6] It is worthy to note that crisis associated with pandemic diseases such as SARS, H1N1 or COVID-19 differ fundamentally from a global financial crisis. First, the key upheaval that originated the global financial crisis stemmed from the financial sector with the Lehman Brothers, a sprawling global bank. In contrast, the global disease outbreaks originate outside the financial sector (Fahlenbrach et al. 2020). Moreover, the radical and abrupt real effects of pandemics are substantial relative to that of the global financial crisis as numerous firms experience abrupt shocks to their earnings, production, and growth prospects (Pettenuzzo et al. 2020; Halling et al. 2020). As noted by Pettenuzzo et al. (2020), key macroeconomic indicators fall sharply in April 2020 relative to what manifested in the worst month of the global financial crisis. Lastly, pandemics can also originate and evolve simultaneously into a period with stressed financial system, such as the coincidental occurrence of the H1N1 virus outbreak (2009-2010) and the global financial crisis (2007-2009), or as observed in March 2020 where various financial markets seized up.

on a sample of 5,209 U.S. firms spanning the period from 2002 to 2019. Our contention is that, while the ongoing Covid-19 pandemic provides an extreme case, outbreaks of pandemic diseases are not without precedent in recent times, and much can be learned about the resilience of the corporate sector from antecedents. First, for firms that encounter extreme levels of uncertainty because of pandemic exposure, larger cash holdings may mitigate underinvestment, reduced growth, suspension of dividend payouts and share repurchases (Tawiah et al., 2024; Pettenuzzo et al., 2020; Bates et al., 2009). "Cash is king" and, by holding large amounts of it, firms are more equipped to cope with unexpected future events such as meeting their investment, production, and earnings targets. Second, in recent years, U.S. firms have held substantial cash balances[7] primarily to counter policy uncertainty (Duong et al., 2020), gain first-mover advantages (Ma et al., 2020), alleviate technology spillovers (Qiu and Wan, 2015), and to maintain competitiveness and prevent potential talent loss (He, 2018); key conditions that may need requisite attention post exposure to pandemics. Third, corporate managers are more responsive to exposure by managing cash holdings than long-term oriented capital structure decisions (Pettenuzzo et al., 2020). Lastly, corporate cash reserves are relatively easily accessible and manageable with little scrutiny. Consistent with these underpinnings, we provide strong evidence that firms tend to hold more cash when they are exposed to pandemic risks.

Employing a battery of robustness checks, we also provide alternative explanations to isolate the extent of the pandemic exposure-cash holding relation. We argue that, if firms increase their cash holdings in response to higher disease exposure, this effect should be stronger for firms which are more exposed to the risks/uncertainty ex-ante. In our analysis, we test whether firms are more likely to be affected by disease exposure if they (i) depend

[7] [7] Exceeds 1.3 trillion dollars (Hoberg et al., 2014), accounts for over 45% of financial assets (Duchin et al., 2017) and 23% of total firm assets (Bates et al., 2009).

significantly on the government for their sales (Belo et al., 2013), (ii) have governments as their major clients/customers (Dhaliwal et al., 2016), (iii) have less lobbying power (Cao et al., 2018), (iv) have higher cash flow sensitivity to changes in disease exposure (Halling et al., 2020), (iv) have a specialist, generalist or more able CEO (Demerjian et al., 2012; Custódio et al., 2013), (v) have a male or female CEO (Faccio et al., 2016), and (vi) are at a key stage of the firm life cycle (Arikan and Stulz, 2016). In the final stage of our empirical analysis, we document the strategic motives underlying managers' conservative cash holdings policy to deal with increasing pandemic disease exposure through the lens of (i) capital investment and (ii) total corporate payouts.

By way of preview, our main results reveal that corporate cash holdings increase during pandemic diseases or outbreaks. The positive impact of pandemic disease exposure (DEXPOSURE) on firm cash holdings remains unchanged after controlling for firm- and CEO-specific effects, prior pandemic effect, firm investment opportunities and other sources of general macroeconomic uncertainty. The positive effect is also robust after accounting for endogeneity concerns and using alternative measures of disease exposure, DRISK and DSENTIMENT, with the sentiment component having the biggest influence. This result is not surprising given that DSENTIMENT mitigates any biases associated with text-based measures of risk by controlling for the likelihood of shocks. Further, our study shows that pandemic disease exposure affects cash holdings more for firms that rely significantly on government spending (i.e., government serving as one of their major clients/customers) to support their operations. However, firms with greater lobbying power reduce corporate cash holdings during pandemic outbreaks. This stems from the fact that firms with greater lobbying power are able to seek government bailouts, favourable legal treatments and new government contracts during periods of pandemic disease compared to those with less lobbying power. In our analysis of whether the likelihood of financial constraints serves as an economic channel, we use the cash-

cash flow sensitivity model of Almeida et al. (2004) to document that a higher degree of disease exposure encourages firms to save more cash from internally generated cash flows towards mitigating the likelihood of financial constraints.

Out of necessity, we observed that firms managed by generalists or less able managers tend to hold more cash when pandemic disease exposure heightens. Our results further indicate that female CEOs put more weight on the precautionary role of cash holdings to guard against any potential risks and undesirable events in the future, rather than the opportunity cost of holing cash during pandemic disease outbreaks. This supports the notion that pandemics create a corporate and leadership challenge whereby managerial characteristics and competencies become essential in leading through and beyond a pandemic. In addition, our study reveals that large and also mature firms put less weight on the precautionary role of cash holdings to guard against any potential risks during pandemic disease outbreaks. In our examination of the strategic motives behind cash holdings policies, we demonstrate that cash holdings alleviate the dampening effect of pandemic disease exposure on capital expenditure and total corporate payouts. While capital expenditure and total corporate payouts are negatively related to disease exposure, firms that hold more cash have more slack to achieve their investment and payout targets than firms with lower levels of cash holdings. These findings suggest that larger cash accumulations allow firms to undertake value-enhancing projects (either tangibles or intangibles) that might otherwise be halted or postponed (Almeida et al., 2004; Duong et al., 2020) due to increased pandemic disease exposure.

We make three primary contributions to the literature in the following ways. First, our study informs research on corporate cash holding during periods of pandemic disease outbreak. While a few studies (e.g., Alfaro et al., 2020; Schoenfeld, 2020; Bansal et al., 2020) have examined the impact of pandemic disease outbreaks on global stock and the financial markets, to the best of our knowledge, no study has so far examined the influence of disease outbreak

on corporate cash holding. Thus, our paper is the first to do so and, by so doing, contribute to the literature on corporate cash holdings (e.g., Tawiah et al., 2024; Chung et al., 2023; Duong et al., 2020; Cheung, 2016; Lyandres and Palazzo, 2016). Our second contribution is regarding how disease exposure affects cash holdings for firms that rely significantly on government spending to support their operations and those with greater lobbying power. In doing so, we provide novel evidence that greater dependency on government as a major customer could detrimentally affect corporate cash holding during pandemic outbreaks. This is due to the fact that, in pandemic outbreaks, governments are stretched to the limits to provide an adequate response to the public health emergency and may refocus their spending or expenditure onto certain industries (e.g., healthcare industry and pharmaceuticals) at the expense of others. However, for firms with greater lobbying power, the sensitivity of their cash holding decisions to pandemic disease outbreaks decreases. This finding is important because it shows how lobbying power (Chen et al., 2015; Hill et al., 2013) serves as a valuable asset during the period of pandemic disease outbreaks. Third, corporations and governments are two primary institutions that fulfil global needs, and the leadership of these institutions directly impacts how they achieve this purpose. At the corporate level, leadership directly impacts both firm and increasingly social outcomes, particularly during exposure to pandemics and crises. Particularly, we demonstrate that the intrinsic value and perspectives that women can bring to corporate leadership environments are needed more during pandemics. Further, we show that specialists or efficient CEOs may secure greater financing and/or make better use of cash during disease outbreaks than CEOs with general skills. By focusing on executive ability and gender, we add to prior work that links managerial personality traits to strategic decisions of firms (e.g. Lartey et al., 2020; Aktas et al., 2019; Hackbarth, 2008). Overall, by holding large amounts of cash, firms are more equipped to cope with unexpected future events.

The remainder of the paper proceeds as follows: section 2 details the data sources and methodology along with our variable specifications. Sections 3 and 4 present descriptive statistics, our primary empirical results and further analyses. Section 5 offers implications and the conclusion of the paper.

2. Data and Methodology

2.1. Data sources

To examine the relation between exposure to pandemic diseases and corporate cash holdings, we use the Hassan et al. (2020) text-based measures of firm-level exposure to pandemic diseases. In the tests that deployed dummy variables, we collected data on timelines of key pandemic and pandemic diseases or outbreaks from the WHO website[8]. We obtain firm-level, stock and CEO-related information from the Center for Research in Securities Prices (CRSP)/Compustat Quarterly and ExecuComp database respectively. Following prior studies on corporate cash holdings (Fernandes and Gonenc, 2016; Aktas et al., 2019), we exclude financial and utility firms due to the regulated nature and abnormalities associated with their capital and liquidity decisions. We also exclude healthcare and pharmaceutical firms since their circumstances during a public health crisis are plausibly different in several ways from other firms. Further, consistent with Duong et al. (2020), we eliminate firms that are not incorporated in the U.S. and observations with negative sales, assets or dividends. We further exclude observations with negative market-to-book ratios or ratios above 10 (Almeida and Campello, 2007). The final sample comprises 5,209 firms and covers the period 2002–2019.

[8] https://www.emro.who.int/pandemic-epidemic-diseases/health-topics/related-health-topics.html

2.2. Exposure to pandemic diseases

The three firm-level pandemic disease exposure measures are based on the general text-classification method (Hassan et al., 2019, 2020) which uses computational linguistic algorithms to gauge the exposure of firms to disease outbreaks (pandemics) by counting the number of times the disease is mentioned during the quarterly earnings conference call session of publicly listed firms. Inherently, earnings conference calls serve as an avenue for senior management to respond directly to questions from stakeholders about their firm's prospects. Besides the timely disclosures, the process includes the very important question and answer session where management is required to respond to pertinent matters that may not otherwise have risen during normal conversations.

The list of pandemic diseases or outbreaks examined is obtained from the World Health Organization (WHO) website[9] and comprises those that provoked adequate international audience and potentially were a concern to investors. These pandemic diseases comprise SARS, MERS, H1N1, Ebola and Zika. The three time-varying measures of a given firm's exposure to a pandemic disease, d, is constructed by parsing the available earnings call transcripts and counting the number of times that specific words[10] associated with each disease are used by management. The derived value is subsequently weighted by the total number of words in the transcript to account for differences in transcript length. Specifically, the first measure, Pandemic Disease Exposure, has the following form

$$DiseaseExposure_{i,t}^{d} = \frac{1}{B_{i,t}} \sum_{b=1}^{B_{i,t}} 1[b = Disease_d] \qquad (2)$$

Where $b = 0,1, \ldots B_{i,t}$ denotes the word count in the transcript of firm *i* in quarter *t*.

[9] https://www.who.int/emergencies/diseases/managing-epidemics/en/
[10] See Appendix Table 2 of Hassan et al. (2020) for the word (combination) list.

The two alternative measures capture the first and second moment, respectively, of a given firm's exposure to a pandemic disease outbreak. The use of these two other measures allows one to clearly separate those firms that expect to gain from these disease events from those that expect to lose. Specifically, Pandemic Disease Risk is measured by augmenting Eqn. (2) to focus on the proximity to synonyms for risk or uncertainty to capture the second moment.

$$DiseaseRisk_{i,t}^{d} = \frac{1}{B_{i,t}} \sum_{b=1}^{B_{i,t}} \{1[b = Disease_d] \times 1[|b - r| < 10]\} \quad (3)$$

where r represents the position of the nearest synonym for risk or uncertainty, and captures about 10 words before and after the mention of a pandemic disease.

Disease Sentiment mitigates any biases associated with text-based measures of risk by controlling for the likelihood of shocks. Specifically, disease sentiment accounts for the effect of the disease event on the conditional mean of the firm's future earnings. The measure augments Eqn. (3) to focus on positive- or negative-tone words[11] (see Loughran and McDonald, 2011) to capture the first moment.

$$DiseaseSentiment_{i,t}^{d} = \frac{1}{B_{i,t}} \sum_{b=1}^{B_{i,t}} \left\{ 1[b = Disease_d] \times \left(\sum\nolimits_{c=b-10}^{b+10} S(c) \right) \right\} \quad (4)$$

where S assigns sentiment to each call (c):

$$S(c) = \begin{cases} +1 \; if \; c \in S^{+} \\ -1 \; if \; c \in S^{-} \\ 0 \; otherwise \end{cases}$$

2.3. Control variables

[11] See Appendix Table 4 and 5 of Hassan et al. (2020) for the list of most frequently used tone words.

In line with the prior literature (Harford et al., 2014; Aktas et al., 2019; Duong et al., 2020), we controlled for other standard firm-level and CEO-specific variables that are likely to affect cash holdings. These are Firm Size (SIZE), Tobin's Q (TQ), Return on Assets (ROA), Book Leverage (BLEV), Earnings volatility (EVOL), Dividend (DIV), Capital Expenditure (CAPEX), Asset Tangibility (TANG), Financial Constraint (CONST), Herfindahl Index (HHI), Stock Return Volatility (RETURN), Firm Age (FAGE), CEO Duality (DUALITY), CEO Age (AGE), CEO Gender (GENDER), CEO Tenure (TENURE), CEO Compensation (COMPENS), and CEO Optimism (OPTIMISM). By explicitly controlling for these variables, the cash holding model captures the direct effect of pandemic disease exposure attributable to precautionary purposes, the indirect effect attributable due to investment delays and the behavioural effect attributed to an individual's personality. We also incorporate controls for other sources of general macroeconomic uncertainty to address residual endogeneity concerns that investment opportunities and general macroeconomic conditions may increase exposure and drive cash-level decisions (Duong et al., 2020). To address this concern, we follow prior literature (e.g., Bloom, 2014; Gulen and Ion, 2016) and employ five standard measures of firm investment opportunities at the aggregate level: GDP growth (ΔGDP), Real exports (LnEXP), the Michigan Consumer Confidence Index (CCI), the Industrial Confidence Index (ICI) and the BBD policy-related uncertainty index (EPUBBD). These three indexes focus on separating the effects of political cycles from the business cycles as well as measuring the exposure related to pandemic diseases rather than macroeconomic uncertainty or weaker economies, since an increased pandemic disease exposure may be highly correlated with an increase in general economic uncertainty (Hassan et al., 2020). To control for further external influences, we also include the following six plausible instruments of financial and monetary policy that possibly affect firm cash holdings in Eqn. (1). We first follow Ludvigson et al. (2019) to include selected bond yields, bond spreads, and the short-term interest rate. To control for private credit-related

measures, we include loans to Nonfinancial Corporations (LOANNFCs) and lending rate to NFCs (LENDRATE). Finally, to control for equity market-based uncertainty and performance, we include the implied volatility index (VXO) from the Chicago Board Options Exchange, and the S&P500 Composite Price Index (SMI), respectively. In line with Han and Qiu (2007), we also include the lagged three to four quarter cash holdings to control for any persistence of cash holdings among quarters. Table 1 provides a summary and description of all the key variables used in our main analyses.

[Table 1 about here]

2.4. Baseline model

We test the impact of pandemic disease exposure on corporate cash holdings by estimating the following baseline regression:

$$CASH_{i,t+1} = \alpha + \beta_1 EXPOSURE_{i,t} + \beta_2 CONTROL_{i,t} + \omega_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

The dependent variable, cash holding, is $CASH_{i,t+1}$ of firm *i* in time *t+1* (as defined in Table 1). The test variable, pandemic disease exposure, $EXPOSURE_{i,t}$, is captured via the text-based measures in Hassan et al. (2020). $CONTROL_{i,t}$ is the vector of the control variables employed in our analysis, α and β are parameters, ω_i accounts for firm-specific effect, and μ_t is the quarter-year fixed effect. All estimated standard errors are clustered at the industry level to ensure that observations are independent across industries but not necessarily independent within industries. This is appropriate given that exposure to pandemic diseases may manifest at industry level and thus the regression errors may be correlated within industry groupings. In addition, to account for heteroscedasticity, clustering at the industry level addresses the

concerns that the residuals may be (i) serially correlated within a firm and (ii) correlated across firms within the same industry.

3. Results and Discussion

3.1. Descriptive statistics and correlation matrix

Table 2 describes the various variables employed in our empirical analysis. The mean cash holdings ratio (CASH) is 21.7%, with a wide variation (SD) of 22.5%. This is consistent with those reported in Faulkender et al. (2019), Ghaly et al. (2017) and Chen et al. (2012). The median firm has cash equal to 13.2% of its assets, suggesting that the cross-sectional distribution of cash holdings is right-skewed. The independent variables, DEXPOSURE, DRISK and DSENTIMENT, also reveal wide variation. These variables have a mean of 0.226, 0.035 and -0.026, respectively, and a standard deviation of 0.239, 0.026 and 0.014, respectively. The correlation between the variables is also presented in Table 3. The table reveals that DEXPOSURE is highly correlated with the alternative measures, especially with DSENTIMENT (0.833), but less so with DRISK (0.736). More importantly, we find that the degree of pandemic disease exposure (DEXPOSURE) is positively correlated with firm cash holdings (CASH). Among the other alternative measures of pandemic disease exposure, disease risk (DRISK) has the highest correlation with firm cash holdings (0.018). These preliminary findings provide an early indication of a positive impact of pandemic disease exposure on corporate cash holdings.

[Table 2 & 3 about here]

3.2. Pandemic disease exposure and cash holding

In this section, we examine the effect of pandemic disease exposure on corporate cash holdings. Table 4 reports the empirical results after controlling for the standard firm-level characteristics, firm investment opportunities and macroeconomic uncertainties that affect cash holdings. Models (1) and (2) report the regressions associated with Eqn. (1). Specifically, only DEXPOSURE, firm and year-quarter FEs are specified in Model (1), firm-level control variables are further incorporated in Model (2). The results suggest that an increase in disease exposure is associated with higher firm cash holdings in the subsequent period, manifested by the positive and statistically significant coefficient of DEXPOSURE. Nevertheless, relying solely on these results may be inadequate due to residual endogeneity concerns. To address this concern, we augment our baseline specifications by adding the CEO controls to capture the behavioural effect on cash holdings (Model (3)), and the investment opportunities, financial and macroeconomic uncertainty variables to capture any exposure on cash holdings (Model (4)). The results show that the positive effect of DEXPOSURE on corporate cash holdings holds after controlling for CEO attributes, aggregate investment opportunities and macroeconomic uncertainty, and the economic magnitude of the effect increases significantly. The coefficient in Model 1 shows that a one-standard-deviation increase in sample DEXPOSURE is associated with an increase in cash holding by about 3 percentage points (=0.106 × 0.239), a sizable effect relative to the sample average cash holdings of 21.7%. The inclusion of firm, CEO and Macroeconomic controls in Model 4 increases the economic significance to about 10 percentage points (=0.423 × 0.239). Together, these results imply that, in the presence of high disease uncertainty, firms can go to the extent of doubling the level of cash holdings so as to equip themselves effectively to cope with any unexpected future events. These results confirm the findings of existing studies which suggest that, in recent years, U.S.

firms have held substantial cash balances[12] primarily for precautionary motives (e.g., Tawiah et al., 2024; Duong et al., 2020; Ma et al., 2020; He, 2018). Indeed, a 2024 Harvard Business Review report from Govindarajan et al, (2024) found that post covid-19 pandemic, non-banking U.S. firms increased their hoards of cash to as high as 6.9 trillion dollars (year ending 2022), an amount larger than the GDP of all but two countries (US and China).

Models (5-8) and (9-12) of Table 4 report the regression results using each of the first moment exposures to pandemic diseases, DRISK and DSENTIMENT, respectively. The results show that all these pandemic disease exposure sources can independently and upwardly drive firm cash holdings in the subsequent period, $CASH_{i,t+1}$, after controlling for firm-control variables as in Model (2), and the CEO controls in Model (3), as well as four investment opportunities and six macroeconomic uncertainty variables as in Column (4). However, the coefficient estimates or the impacts on cash holdings differ across these components, with DSENTIMENT being the strongest factor. This outcome is not surprising given that DSENTIMENT mitigates any biases associated with text-based measures of risk by controlling for the likelihood of shocks. Specifically, DSENTIMENT accounts for the effect of the disease event on the conditional mean of the firm's future earnings or cash holdings. In terms of economic importance, a one-standard deviation increase in DRISK (DSENTIMENT) on average, drives a 0.55 – 0.75 (0.59 – 0.92)[13] percentage points increase in corporate cash holding.

[Table 4 about here]

[12] Exceeds 1.3 trillion dollars (Hoberg et al., 2014), accounts for over 45% of financial assets (Duchin et al., 2017) and 23% of total firm assets (Bates et al., 2009).
[13] Calculated as (=0.210 × 0.026) and (=0.287 × 0.026); and (=0.423 × 0.014) and (=0.658 × 0.014).

We then average our dependent variable, $CASH_{i,t+1}$, by year and plot the time series evolution of corporate cash holdings over time in Figure 1. It also plots the cash holdings together with key pandemic disease timelines within our sample period, 2002–2019. We use timelines of key pandemic and pandemic diseases or outbreaks from the WHO website and plotted those pandemics that provoked adequate international audience and were of probable concern to investors (i.e., SARS, H1N1, MERS, Ebola and Zika). According to the WHO timelines, the SARS virus outbreak started in 2002Q4 to 2004Q2; the H1N1 virus outbreak followed in 2009Q1 to 2010Q4; followed by the MERS outbreak in 2012Q3 to 2013Q4; then the Ebola virus outbreak in 2013Q4 to 2016Q2; and the Zika outbreak in 2015Q2 to 2016Q4[14]. We observe the following noticeable patterns. First, the plot reveals a positive correlation between pandemic disease outbreaks and corporate cash holdings. We observe a steep rise in corporate cash holdings immediately when the WHO announces the disease as a global outbreak. Particularly, cash holdings by U.S. firms increased significantly during the H1N1, Ebola and Zika virus outbreaks, but less so during the SARS and MERS virus outbreak. Second, pending the likely postponement of firm investment decisions, we observe that cash holdings appear to decrease significantly in the aftermath of the various disease pandemics. Key reasons for this outcome are that the zeal to achieve competitive and first-mover advantages stimulates firms to resume their aggressive risk taking and high investment goals immediately the outbreak begins to subside. Specifically, we find consistent evidence suggesting that, during pandemic diseases or outbreaks, corporate cash holdings increase. Similarly, corporate cash holdings decline when the WHO lifts its outbreak alert.

[Figure 1 about here]

[14] The Covid-19 outbreak, also known as the coronavirus pandemic, is an ongoing global pandemic which began in 2019Q4.

3.3. Robustness tests

3.3.1 Robustness tests – Prior pandemic experience

The above results indicate that U.S. corporations are likely to hold more cash during pandemic disease outbreaks due to uncertainties associated with production and demand. In this section, we test whether prior pandemic experiences are associated with more negative expectations for the future. We consider whether a firm's prior exposure to the next most virulent diseases (e.g., SARS, Ebola, Zika and H1N1), allows the firm to learn from the experience and shape its expectations for future pandemics. In Table 5, we augment our baseline model to include controls for mentions of prior experience. In PANEL A, we include controls for mentions of prior experience with SARS, Zika, H1N1 or Ebola, based on the language in the quarterly conference call. The results show that experience with Ebola and H1N1 has a positive and significant impact on corporate cash holding. However, prior experience with Zika and SARS has a negative effect, but this negative effect is significant for the former and insignificant for the latter. We obtain similar results in PANEL B when we use dummy variables to capture the experience of managers/firms during the period of the pandemics (SARS, Zika, H1N1, MERS or Ebola). Key explanations for these findings are that, while firms might learn from their prior experience, ultimately, the SARS and Zika pandemics were of a much smaller magnitude and thus, had less severe macroeconomic consequences. However, firms might very well overestimate (underestimate) their preparedness based on their prior experience by holding more (less) cash[15].

[Table 5 about here]

[15] In Table 1A of the Online Appendix, we bifurcate $DiseaseSentiment_{i,t}^{d}$ into $DiseasePositiveSentiment_{i,t}^{d}$ and $DiseaseNegativeSentiment_{i,t}^{d}$, by conditioning on the use of positive or negative tone sentiment. The

3.3.2. Identifying the effects of DEXPOSURE on corporate cash holdings

To address endogeneity concerns and isolate the effect of pandemic disease exposure from general economic condition and to establish the causal link between DEXPOSURE and corporate cash holdings, we employ the 2-stage IV approach. For our instrumental variables, we use five key measures that capture pandemic resilience based on social distancing interventions using data from O*Net surveys in Koren and Pető (2020). These industry-level measures capture the extent to which firms' operations and jobs can be carried out from home without relying extensively on human interaction in physical proximity. These are whether interventions are due to internal communication (COMM_SHARE), external communication (CUSTOMER_SHARE), physical proximity to others (PRESENCE_SHARE), and aggregate teamwork and communication intensity (TEAMWORK_SHARE), and the percentage of employees affected by social distancing regulations because their jobs involve intensive communication and/or require close physical proximity to others (AFFECTED_SHARE). These measures are appropriate since they capture the increase in uncertainty regarding what policies may be implemented (i.e., government furlough, state taxes, government spending and contracts) and how these new policies may impact firm outcomes. Moreover, firms have less influence over these government interventions during pandemic disease outbreaks.

We first regress DEXPOSURE on the instrument and other exogenous variables of the model

$$DEXPOSURE_{i,t} = \alpha + \beta_1 DEXPOSURE\_IV_{j,t} + \beta_2 CONTROL_{i,t} + \omega_i + \mu_t + \varepsilon_{i,t} \qquad (5)$$

where $DEXPOSURE\_IV$ is AFFECTED_SHARE, COMM_SHARE, PRESENCE_SHARE, CUSTOMER_SHARE, and TEAMWORK_SHARE as defined above.

results show that firms that have significantly negative disease-related sentiment scores hold more cash relative to their counterparts.

$DEXPOSURE_{i,t}$, and $CONTROL_{i,t}$ denote the measure of pandemic disease, and the other direct proxies for firm, CEO, and general economic conditions, respectively.

From Eqn. (5), we replace $DEXPOSURE_{i,t}$ with the fitted values, $INST\_DEXPOSURE_{i,t}$:

$$CASH_{i,t+1} = \alpha + \beta_1 INST\_DEXPOSURE_{i,t} + \beta_2 CONTROL_{i,t} + \omega_i + \mu_t + \varepsilon_{i,t} \quad (6)$$

where $INST\_DEXPOSURE_{i,t}$ is the predicted value of DEXPOSURE from Eqn. (5), $CONTROL_{i,t}$ is our vector of firm, CEO and/or general economic control variables, ω_i and μ_t capture firm fixed effects and quarter-year effect, respectively, and $\varepsilon_{i,t}$ is the random error. The regression results for Eqn. (5) and Eqn. (6) are documented in Table 6.

For these instrumental variables to be considered valid, they must satisfy both the relevance and exclusion conditions (Roberts and Whited, 2013). First, each of these instrumental variables should be positively related to DEXPOSURE after netting out the effects of other exogenous variables. Theoretically, new and intense interventions during pandemic disease outbreaks signal the extent and greater uncertainty about the future and will therefore lead to higher cash holding. To test this relevance condition, we first investigate the impact of the instruments on DEXPOSURE in the presence of the firm, CEO and macroeconomic variables. We find that all the instruments are significantly related to DEXPOSURE (all first-stage models). Firms with operations requiring more direct physical interaction and jobs that are less easily performed from home should be less resilient to social distancing rules, and therefore should hold more cash. Furthermore, the F-statistics are 15.76, 15.94 and 15.28; and the Hansen J p-value 0.134, 0.154 and 0.147, respectively[16], alleviating concerns that the

[16] The Hansen J p-values are all in excess of 0.1, implying that the over-identifying restrictions are valid (e.g., Baum et al., 2003). Also, F statistics, compared with the Stock-Yogo IV critical values, rule out weak instrument problems; they are all larger than the rule-of-thumb minimum of 10 (Baum, 2006).

instruments may be weak. In the second-stage models, we observe that the coefficient of $INST\_DEXPOSURE_{i,t}$ is significantly positive. This confirms our baseline findings that pandemic disease exposure upwardly drives corporate cash holding.

[Table 6 about here]

3.3.2. Falsification Tests

To further test the reliability of our results, we attempt to examine the effects of omitted variables that may coincide with or arise due to timing of the relation between disease exposure and cash holding. If this argument is valid, then the changes in cash holdings attributable to disease exposure may reflect mere association rather than causality. However, pandemic disease exposure manifests at different times, providing multiple exogenous shocks that affect the various firms/industries at different times. Therefore, if the change in cash holdings is truly the response to disease exposure, we should observe significantly positive coefficients estimation for the change in cash in relation to the change in disease exposure. To address this concern, we follow Cornaggia et al. (2015) and Boasiako and Keefe (2021) to perform a falsification test. We follow a four-step process in the randomization test. First, we randomly assign firms to the 3 equal groups. Next, we keep only one of the groups as the falsified sample. Third, we then assign the falsified sample to random industry groupings. Lastly, firms are randomly assigned to quarter-years in which the various disease exposure manifested. By doing this, we disrupt the correct assignment of the firms to the industries and years in which the disease exposure manifested. Therefore, an unobservable shock that occurs at approximately the same time as the manifestation of pandemic diseases would still reside within the baseline tests and, thus, bias the cash holding results. In contrast, where no such unobservable shocks exist, then we expect that the incorrect assignment of firms and industries to the pandemic

years should weaken our results for the re-estimated baseline specification. Thus, the falsely assumed disease exposure events should have no effect on cash holdings. The results in Table 7 show that indeed, there is no statistically significant effect of disease exposure on corporate cash holdings following the random assignment. The coefficients on the disease exposure variables in models (1) to (6) are all statistically nonsignificant. Therefore, we provide further evidence that the absence of an omitted variable bias by confirming that the cash holding effects observed in firms actually do originate from pandemic disease exposure.

[Table 7 about here]

3.4. Variations in the relation between pandemic disease exposure and cash holdings

3.4.1 Firms' dependence on government spending

First, we examine whether pandemic disease exposure affects cash holdings more for firms that rely significantly on government spending to support their operations. Intuitively, if higher pandemic disease exposure drives firms to hold more cash, then the influence should be stronger for those firms that are more exposed to government demand. To test this prediction, we follow prior literature (e.g., Duong et al., 2020; Belo et al., 2013) to compute the percentage of industry sales that are attributed to government purchases by using data from the Benchmark Input-Output Accounts[17]. Specifically, the total amount of input from industry *i* consumed, directly and indirectly, to meet the total government sector demand is computed as:

$$x_i = \sum a_{i,j} \cdot g_j$$

where $a_{i,j}$, is the dollar amount of input from industry *i* consumed to produce one dollar of final use of industry *j*'s product from the industry-by-commodity table in the I-O accounts.

[17] Available from the Bureau of Economic Analysis (BEA) website https://www.bea.gov/industry/input-output-accounts-data.

We then compute each industry's reliance on government spending as the ratio x_i/y_i, where y_i is the industry's total output extracted from the use tables.

Due to the highly industry-concentrated attribute of this government spending measure (Duong et al., 2020), we construct an indicator variable, HIGHGOVSP, which is equal to one if government spending is greater than the sample median value, and zero otherwise. This empirical design allows us to augment our baseline regression to incorporate the independent HIGHGOVSP dummy as well as its interacted exposure components. The variables of interest are the interaction terms DEXPOSURE*HIGHGOVSP, DRISK*HIGHGOVSP and/or DSENTIMENT*HIGHGOVSP, which capture the impact of the degree of government contractual relations on the relation between pandemic disease exposure and firm cash holdings. The even-numbered models of Table 8 report the regression results after accounting for firm and CEO characteristics, firm investment opportunities and macroeconomic uncertainty. The results suggest that the dependence on government spending serves as a mechanism through which pandemic disease exposure reinforces its positive impact on firm cash holdings, as indicated by the positive and statistically significant coefficient of the interaction terms. Specifically, the evidence suggests that higher exposure to government spending makes cash holding decisions more sensitive to pandemic disease outbreaks.

We also utilise an alternative proxy for firms' dependence on the government. We contend that firms rely extensively on government spending if the government serves as one of their major clients/customers. We use data from the Compustat customer segment to identify whether a firm has the government as their key client/customer (Dhaliwal et al., 2016). GOV_CLIENT is an indicator variable that is equal to one for firms that have government as their major customer, and zero otherwise. Again, we augment our baseline regression to incorporate the independent GOV_CLIENT dummy as well as its interacted exposure components. The results in Table 8 show a positive and statistically significant coefficient on

the interaction terms DEXPOSURE*GOV_CLIENT, DRISK*GOV_CLIENT and/or DSENTIMENT*GOV_CLIENT, therefore suggesting that firms indeed hold more cash if they maintain a closer customer-supplier relationship with the government. During pandemic outbreaks, governments are stretched to the limits to provide an adequate response to the public health emergency. In doing so, they may refocus their spending or expenditure onto other industries (e.g., healthcare industry and pharmaceuticals). By holding more cash, non-beneficiary firms can mitigate the impact of disease pandemics on their operations.

[Table 8 about here]

3.4.2 Firms with greater lobbying power

We now examine whether pandemic disease exposure affects cash holdings more for firms that have no relationship with the government through lobbying. Government regulations and actions during disease outbreaks (e.g., furlough) can shape a firm's business conditions. Lobbying may therefore serve as an effective means to help firms stay informed of regulatory agenda, obtain timely political information to adjust their business decisions, and to encourage (discourage) any regulatory decisions that may be beneficial (detrimental) to a firm during outbreaks (Adelino and Dinc, 2014; Cao et al., 2018). Therefore, we ask whether firms with no lobbying relationship or power hold more cash to mitigate any underlying exposure during disease outbreaks. We expect that, where lobbying more enables firms to obtain protection from pandemic exposure by securing government contracts and/or maintaining client relationships when private demand is low, then firms with high lobbying power will hold less cash during disease outbreaks. We collect annual lobbying information from the Center for Responsible Politics (CRP). We use two measures to capture the firm lobbying effect. We calculate the expenditure amount spent on lobbying during the fiscal year (LOBBYIST). We further construct an indicator variable, HIGHLOBBYIST, which is equal to one if lobbying

expenditure is greater than the sample median value, and zero otherwise. The variables of interest are the interaction terms DEXPOSURE*LOBBYIST (DEXPOSURE*HIGHLOBBYIST), DRISK*LOBBYIST (DRISK*HIGHLOBBYIST) and/or DSENTIMENT*LOBBYIST (DSENTIMENT*HIGHLOBBYIST), which capture the impact of the importance of corporate lobbying on the relation between pandemic disease exposure and firm cash holdings. The results in Table 9 suggest that lobbying power reduces corporate cash holdings, as indicated by the negative and statistically significant coefficient of the interaction terms. Firms do not only lobby for government bailouts, but also for favourable legal treatment and new government contracts. The evidence suggests that, where firms can use their financial resources to impact policy proposals, then the sensitivity of cash holding decisions to pandemic disease outbreaks decreases.

[Table 9 about here]

3.4.3 Economic channel: cash-cash flow sensitivity

Global capital markets encounter enormous risks during disease outbreaks. The theoretical and empirical literature suggest that stock investors require risk premia for uncertain government policies which lead to stock price decline, and consequently a higher corporate costs of equity capital (see e.g., Pástor and Veronesi, 2012, 2013). Furthermore, in the ongoing Covid-19 pandemic, banks face an unprecedented increase in liquidity demands as asset prices decrease drastically across capital markets. In line with this, Halling et al. (2020) argue that equity and corporate bond issues dry up precisely during crisis times such as disease outbreaks. Likewise, disease outbreaks may hinder bank credit growth at both aggregate- and bank-specific levels, affect firms' operations negatively and inevitably result in breaches of financial covenants (Li et al., 2020); thus, suggesting that firms may face difficulties in accessing the external capital markets when pandemic exposure increases, and consequently increasing their

precautionary motives for reserve cash (Duong et al., 2020; Harford et al., 2014). Campello et al. (2020) note that credit constraints intensified cuts in job postings during disease outbreaks. Therefore, we expect that firms will reserve more cash from cash flows when pandemic decision-making is highly unstable. To test this conjecture, we use the cash-cash flow sensitivity model (Almeida et al., 2004) with the yearly change in the cash level as the dependent variable. The variables of interest are the interaction terms DEXPOSURE*EVOL, DRISK*EVOL and/or DSENTIMENT*EVOL, which capture the effect of pandemic disease exposure on the sensitivity of cash reserves to cash flows. If firms reserve more cash from cash flows when pandemic exposure/risk/sentiment intensifies, we will observe a significant and positive coefficient on the interaction terms. The regression results are reported in Table 10 with even-numbered models incorporating three additional control variables: change in book leverage (ΔBLEV); change in net working capital (ΔNWC); and capital expenditure (CAPEX), in line with Chen et al. (2012). As anticipated, the coefficients on the interaction terms are positive and statistically significant at 1% level, indicating that firms save more cash from cash flows when pandemic disease exposure increases.

[Table 10 about here]

4. Sources of firm cash holdings in the presence of pandemic disease exposure

4.1 The role of executive ability

Our analysis thus far documents a strong and plausibly causal effect of disease exposure on corporate cash holdings with financial constraints as an economic channel. We now examine key sources of corporate cash holdings during disease pandemics[18]. Organizational leaders

[18] In Table 2A and 3A of the Online Appendix, we further examined the role of firm life cycle (size and age) on the pandemic-cash holding nexus. The results confirm that just like large firms, mature firms also put less weight on the precautionary role of cash holdings during pandemic disease outbreaks, perhaps due to their long history, previous experience, and highly stable sources of finance.

matter not only in what they say or do during a crisis, but also in how they work with the rest of their organization (Lee et al., 2020). The ongoing Covid-19 pandemic has created a corporate and social leadership challenge. Out of necessity, the role of the firm in leading through and beyond pandemics is starting to shift. Social issues are rapidly being integrated into corporate value propositions far beyond just profit and loss. Prior literature (e.g., Demerjian et al., 2012, 2013; Mishra, 2014; Aktas et al., 2019) shows that managerial characteristics and competencies such as ability, talent, style, reputation, or quality affect corporate decision-making. Andreou et al. (2017) contends that general managerial skills, rather than firm-specific skills, drive corporate investment during crisis periods. In this section, we investigate whether executive ability influences how firms accumulate cash in the periods of heightened exposure from disease outbreaks.

We anticipate that, if pandemic exposure/risk/sentiment increases firm financial frictions and managers' negative perception of future earnings stability, then CEOs richer in general managerial skills acquired over a lifetime of work experience (generalist CEOs), as opposed to those who have skills specific to a firm or industry (specialist CEOs), may be more likely to retain a greater portion of their firms' earnings. Furthermore, CEOs who are less efficient, relative to their industry peers, in transforming corporate resources to revenues may also be more likely to hold more cash during disease outbreaks. This expectation draws on early evidence from Mishra (2014) and Eisfeldt and Papanikolaou (2013), who suggest that the market perceives generalist CEOs as valuable organization capital during times of shocks and restructuring. Moreover, generalist CEOs become more conservative as their tenure/experience lengthens, an important factor, which may influence them to hold more cash and limit their appetite to make more investments during disease outbreaks (Andreou et al., 2017). To test this prediction, we use the Demerjian et al. (2012) proxy of managerial ability (MA) and the Custódio et al. (2013) proxy of CEO generality index (GAI) to capture the efficiency and

lifetime work experience of CEOs. The variables of interest are the interaction terms DEXPOSURE*MA (*MAR and *GAI), DRISK*MA (*MAR and *GAI) and/or DSENTIMENT*MA (*MAR and *GAI). If firms managed by a specialist or more able CEO reserve more cash when pandemic exposure/risk/sentiment intensifies, we will observe a significant and negative coefficient on all the interaction terms. The regression results reported in Table 11 show that the coefficients on the interaction terms are positive (negative) and statistically significant (at 1% level) for the GA (MA) interactions. This suggests that specialist or efficient CEOs may secure greater financing and/or make better use of cash by ensuring the marginal value of cash during disease outbreaks. Therefore, firms managed by specialists or more able managers may save less cash when pandemic disease exposure heightens[19].

[Table 11 about here]

4.2 The role of gender

Prior literature suggests that gender is a key indicator of a person's risk-tolerance, with females being more risk-averse than men (Faccio et al., 2016; Hanousek et al., 2019). It is therefore not surprising that a key contention at the centre of the ongoing Covid-19 pandemic is that female national leaders have been more successful at managing the crisis (see e.g. Wittenberg-Cox, 2020; Lee et al., 2020). Wittenberg-Cox (2020) argues that female leaders demonstrated an attractive alternative way of wielding power by exhibiting psychological traits such as empathy, care, trust and decisiveness, and embracing tech. In this section, we contend that not all women that excel during pandemics are national leaders, and that the intrinsic values and perspectives that women can bring to corporate leadership environments are needed more during pandemics. We test this conjecture at the firm level by examining whether female CEOs

[19] We do not in any way imply that generalist CEOs are inefficient.

have a stronger precautionary motive to hold more cash when pandemic disease exposure increases. Female executives pursue less risky corporate policies and are less likely to lie when it is costly to other stakeholders (Hanousek et al., 2019). By adopting a strict ethical stance, female executives tend to extract lesser personal benefits from the firm, thereby leading to more ethical decisions in the workplace (Lund, 2008). They also have a relatively lower overconfidence than their male counterparts (Huang and Kisgen, 2013), which may imply that they may care more about the way the firm's resources are used (e.g., how money is spent), and hence their increased propensity to save more cash when pandemic disease exposure heightens.

We extract data on executive information from ExecuComp to construct a gender (MALE) dummy which is equal to one if the firm's CEO is male, and zero otherwise. In Panel A of Table 12, we segregate our sample based on whether the firm is managed by a MALE or FEMALE CEO. The results show a positive and statistically significant (at 1% level) coefficient of pandemic disease exposure (DEXPOSURE, DRISK and DSENTIMENT) on cash holdings for firms managed by female CEOs. In Panel B, we performed a moderation test by incorporating the independent MALE dummy as well as its interacted exposure components (DEXPOSURE*MALE, DRISK*MALE and/or DSENTIMENT*MALE) to capture the impact of gender on the relation between pandemic disease exposure and firm cash holdings. The results confirm that the female executives reserve more cash, as indicated by the negative and statistically significant coefficient of the interaction terms, therefore suggesting that female CEOs put more weight on the precautionary role of cash holdings to guard against any potential risks and undesirable events in the future, rather than the opportunity cost of holing cash during pandemic disease outbreaks. Overconfident male CEOs may overestimate profits and underestimate the riskiness of investment projects during disease outbreaks, and hence hold less cash.

[Table 12 about here]

5. Implications and conclusion

5.1. Implications of cash holdings for future investment and total payouts

Recent evidence has established a negative effect of Covid-19 on firm capital investment (Acharya and Steffen, 2020; Fahlenbrach et al., 2020; Tawiah et al., 2024) and dividend payments (Pettenuzzo et al., 2020). In this study, we examine whether cash holdings serve as a moderating channel to alleviate such a dampening effect of pandemic disease exposure. Specifically, we argue that, for firms that encounter extreme levels of uncertainty as a result of pandemic exposure, larger cash holdings would allow these firms to mitigate underinvestment, reduced growth, suspension of dividend payouts and share repurchases[20] (Pettenuzzo et al., 2020; Bates et al., 2009). Moreover, by holding large amounts of cash, firms are more equipped to cope with unexpected future events. If this is the case, the evidence will document some of the key benefits of holding more cash when exposure to pandemic disease heightens. To test this prediction, we augment our baseline model such that our dependent variables are $CAPEX_{i,t+1}$ and $PAYOUT_{i,t+1}$ where $CAPEX_{i,t+1}$ proxies for capital investment (i.e. capital expenditure scaled by total assets of firm i in time $t+1$) and $PAYOUT_{i,t+1}$ is the firm total payout ratio (i.e. the sum of dividends and repurchases scaled by total assets[21]). The variables of interest are the interaction terms DEXPOSURE*CASH, DRISK*CASH and/or DSENTIMENT*CASH, which capture the impact of cash holdings on the association between

[20] This expectation draws on prior evidence suggesting that it is optimal for firms to choose conservative payout decisions to reduce their likelihood of tapping into the already malfunctioning external equity markets (see e.g. Halling et al., 2020; Acharya and Steffen, 2020).

[21] Following prior studies (e.g. Adhikari and Agrawal, 2018; Duong et al., 2020), we normalize the total amount of firm payout by book assets, rather than by market capitalization and earnings, to ensure that the results are not influenced by stock price variations or affected by firms with negative earnings.

pandemic disease exposure, capital investment and corporate payouts. If cash holdings mitigate the detrimental impact of pandemic disease exposure on capital investment and payouts, the coefficient of the interaction terms should be positive. We present the regression results for these tests in Table 13.

In particular, the odd-numbered models (1, 3, 5, 7, 9 and 11) explain investment and payout directly. The significantly negative coefficients on DEXPOSURE, DRISK and DSENTIMENT suggest that, when pandemic disease exposure heightens, firms reduce capital investments and total payouts. This confirms the finding that the Covid-19 pandemic is negatively associated with firm capital investment (Acharya and Steffen, 2020) and dividend payouts (Pettenuzzo et al., 2020). In the even-numbered models (2, 4, 6, 8, 10 and 12), we further include the interaction variables independently. The results in models 2, 4 and 6 of Table 13 show that the coefficient of the interaction terms DEXPOSURE*CASH, DRISK*CASH and/or DSENTIMENT*CASH are positive and statistically significant, as expected. This thus stresses the mitigating role of cash holdings on the negative impact of pandemic disease exposure on capital investment. In models 8, 10 and 12, we report the results associated with payouts. These results also confirm our primary position that cash holdings mitigate the negative association between pandemic disease exposure and corporate payouts. Overall, the evidence points to the fact that the scramble for liquidity during Covid-19 is real because, by holding large amounts of cash, firms are more equipped to cope with events after the lockdown. Though almost all firms are affected adversely during pandemics, those with low cash levels may suffer most, even in the aftermath of the pandemic.

[Table 13 about here]

5.2 Conclusion

Pandemic disease outbreaks tend to have unprecedented impacts on corporate cash holdings. Thus, understanding how firms respond to corporate cash holdings is one of the important issues of recent times due to the changing nature of firms. In this study, we examine whether firms hold more cash during periods of pandemics. Notably, we find that firms increase their cash holdings as a result of a pandemic. This result is robust to controlling for firm- and CEO-specific characteristics, firm investment opportunities, and macroeconomic uncertainty. We also find consistent results when we control for prior pandemic experience and/or use the two-stage IV approach. In subsequent analysis, we find that the expected cash holding is more evident for firms that are small, young or highly exposed to the uncertainty through their greater reliance on government spending. However, the cash holding decrease significantly for firms with male CEOs or more able (or specialist) CEOs who possess more specific rather than general knowledge of their business for making better judgements. More importantly, holding more cash in the presence of high disease uncertainty alleviates the negative impact of pandemic exposure on capital investment and corporate payout targets. In all, our study underscores the importance of cash holding for firms during the period of uncertainty.

Our findings offer some important implications. From a managerial perspective, our study demonstrates that greater cash holding reduces the adverse effects of disease pandemics on capital investment and corporate payout. Therefore, the promotion of cash holding by firms is essential especially during good economic times so that firms can continue to invest and pay out dividends during periods of uncertainty when resources are constrained. The failure on the part of a firm to hold adequate cash during periods of good industry and economic conditions could lead to underinvestment and no dividend payment, and this could ultimately impact on the firm's value. Overall, our findings extend the current understanding on the impact of pandemics on corporate policies and behaviours, as well as contributing to the literature on the

role of corporate cash holdings in alleviating the adverse effect of uncertainty on firm real economic activities.

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Figure 1: Time-series evolution of cash holdings and pandemic disease timelines

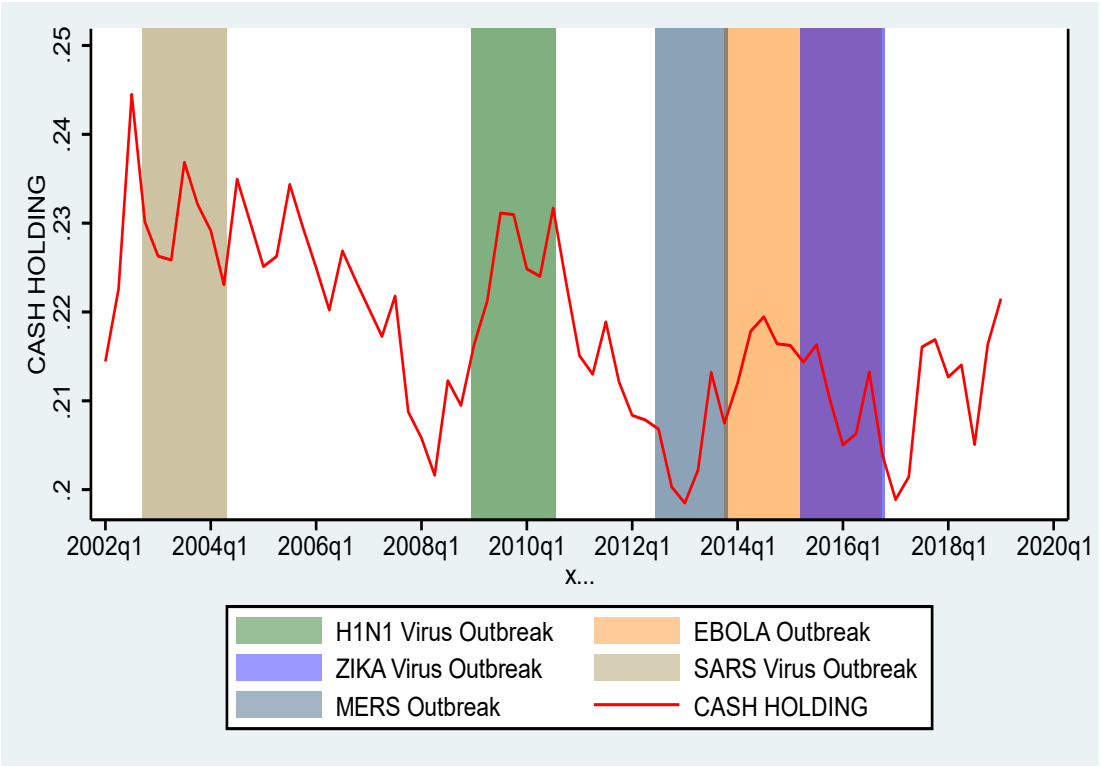

Table 1: Description of variables

Variables	Description
Dependent Variables	
Cash Holdings (CASH)	Cash and marketable securities deflated by total assets.
Change in Cash Holdings (ΔCASH)	Cash and marketable securities at time $t + 1$ minus cash and marketable securities at time t, deflated by total assets.
Independent Variables	
Disease Exposure (DEXPOSURE)	The count of the number of times that disease-related words are used by management, where each number is weighted by the number of words spoken during the Q&A session of the call.
Disease Risk (DRISK)	The counts of the disease-related words that condition on the proximity for risk or uncertainty to capture the second moment.
Disease Net Sentiment (DSENTIMENT)	The counts of the disease-related words that condition on positive- or negative-tone words to capture the first moment.
Firm Specific Controls	
Firm size (SIZE)	The natural logarithm of the book value of Total Assets.
Tobin's Q (TQ)	The market value of assets divided by the book value of assets. It proxies for growth prospects.
Return on assets (ROA)	The operating income before depreciation divided by the book value of assets. It serves as a proxy for profitability and the availability of internal funds.
Book Leverage (BLEV)	The summation of the book value of long-term debt and debt in current liabilities divided by market value of assets.
Earnings volatility (EVOL)	The standard deviation of a firm's return on assets over the previous five years (inclusion in the sample necessitates a firm to have at least three years of data during the prior five years). It is a proxy for the likelihood of financial distress.
Dividend (DIV)	An indicator for whether a firm pays common dividends (i.e. a variable equal to one if a firm pays common dividends, and zero otherwise). It also proxies for financial constraints.
Capital Expenditure (CAPEX)	The net capital expenditure (capital expenditure minus depreciation) divided by the book value of total property, plant and equipment.
Asset Tangibility (TANG)	The book value of total tangible assets scaled by total assets.
Financial Constraint (CONST)	The firm's interest expenditures scaled by total assets. It proxies for a firm's capabilities of obtaining loans.
Herfindahl Index (HHI)	The sum of squares of the market shares of the firm's sales within an industry.
Stock Return Volatility (RETURN)	The quarterly historical stock return volatility, i.e., the standard deviation of monthly stock returns in previous four months.
Firm Age (FAGE)	The natural logarithm of the time between when a firm goes public and the end of the fiscal year.
CEO Specific Controls	
CEO Duality (DUALITY)	An indicator variable equal to one if the CEO is also the chairperson of the board of directors as of the end of the first fiscal year. The dual role also proxies for CEO power as well as the difficulty and complexity of CEO's job.
CEO Age (AGE)	The natural logarithm of CEO's age at the end of the fiscal year.
CEO Gender (GENDER)	An indicator variable equal to one if the CEO is male, and zero otherwise.
CEO Tenure (TENURE)	The natural logarithm of number of years the CEO has served in the position as of the end of the fiscal year. It is an additional proxy for CEO power.
CEO Compensation (COMPENS)	The natural logarithm of CEOs total compensation over the fiscal year. The sum of salary, bonus, total value of restricted stock granted, total value of stock options granted (estimated using Black-Scholes), long-term incentive payouts, and other compensation.
CEO Optimism (OPTIMISM)	An indicator variable equal to one if CEO holds options with average moneyness of at least 67 percent during the fiscal year.
Country-level Controls	

Financial Crisis (FINCRISIS)	An indicator variable equal to one from September 2008 to August 2009. September 2008 (Q3) marks the start of the crisis period when key financial institutions, such as Lehman Brothers and AIG, failed and triggered a sharp increase in the global credit crunch (Lins, Servaes and Tamayo, 2017). In contrast, August 2009 (Q3) marks the start of the steady recovery path in the second half of 2009 (Chor and Manova, 2012).
GDP Growth (ΔGDP)	The quarter-on-quarter growth rates computed as log differences.
Real exports (LnEXP)	The log transformation of total real U.S. exports of goods/services.
Short-term interest rate (FEDRATE)	The effective quarterly federal funds rate in the US. It proxies for monetary policy control.
Bond Yield (BONDYIELD)	The yield on ten-year government bonds.
Corporate Bond Spread (CBS)	The spread between corporate bonds rated BBB with maturity seven to ten years and government bonds with the same maturity.
Lending rate to Nonfinancial Corporations (LENDRATE)	The real bank lending rate to non-financial corporations. It proxies for interest rates on private debt
Loans to Nonfinancial Corporations (LOANNFCs)	The log transformation of the total credit provided by banks to private non-financial sector.
Implied Volatility (VXO)	The CBOE OEX Implied Volatility Index.
Stock Market Index (SMI)	The S&P500 Composite Price Index for stock market performance.
Consumer Confidence (CCI)	The Michigan Consumer Confidence Index from the University of Michigan.
Industrial Confidence (ICI)	The Industrial Confidence indicator from the U.S. Federal Reserve Board.
Economic policy uncertainty (EPUBBD)	The BBD Economic Policy Uncertainty Index (Overall) (Baker et al., 2016).
Instruments	
External Communication (CUSTOMER_SHARE)	An index that measures whether interventions are due to external communication (Koren and Pető, 2020). It captures how reliant the industries are on direct/external communication with customers.
Internal Communication (COMM_SHARE)	An index that measures whether interventions are due to internal communication (Koren and Pető, 2020). It captures how reliant the industries are on internal communication between co-workers.
Teamwork and communication intensity (TEAMWORK_SHARE)	An index that measures whether interventions are due to aggregate teamwork and communication intensity (Koren and Pető, 2020). It captures how reliant the industries are on direct communication with coworkers.
Physical proximity to others (PRESENCE_SHARE)	An index that measures whether interventions are due to physical proximity to others (Koren and Pető, 2020). It captures how dependent the industry is on physical accessibility to each other, disregarding the need for communication.
Employees affected (AFFECTED_SHARE)	The percentage of employees affected by social distancing regulations because their jobs involve intensive communication and/or require close physical proximity to others. It is the aggregate of the three measures of face-to-face interactions (teamwork, customer, and presence) into one measure of total exposure (Koren and Pető, 2020).
Other key Variables	
Prior Epidemic Experience (EBOLA_EXPOSURE)	The scaled (by the length of the transcript) count of the EBOLA synonyms measured at the peak of the EBOLA outbreak.
Prior Epidemic Experience (H1N1_EXPOSURE)	The scaled (by the length of the transcript) count of the H1N1 synonyms measured at the peak of the H1N1 outbreak.
Prior Epidemic Experience (ZIKA_EXPOSURE)	The scaled (by the length of the transcript) count of the ZIKA synonyms measured at the peak of the ZIKA outbreak.
Prior Epidemic Experience (SARS_EXPOSURE)	The scaled (by the length of the transcript) count of the SARS synonyms measured at the peak of the SARS outbreak.
Positive Disease Sentiment (DSENT_POS)	The scaled (by the length of the transcript) count of the positive-tone words used in conjunction with discussions of the Covid-19 pandemic.
Negative Disease Sentiment (DSENT_NEG)	The scaled (by the length of the transcript) count of the negative-tone words used in conjunction with discussions of Covid-19 pandemic.
EBOLA	An indicator variable equal to one from December 2013 to December 2009. Even though the outbreak was declared over in June 2016, December 2009 marks the release of final trial results to confirm that Ebola vaccine provides high protection against the disease.
H1N1	An indicator variable equal to one from February 2009 (Q1) to August 2010 (Q3).
ZIKA	An indicator variable equal to one from April 2015 (Q2) to November 2016 (Q4).
SARS	An indicator variable equal to one from November 2002 (Q4) to May 2004 (Q2).

MERS	An indicator variable equal to one from September 2012 (Q3) to September 2014 (Q3). However, there is an ongoing risk for transmission for MERS as the source of the virus remains unknown and there no vaccine or specific treatment currently available.
Government spending (HIGHGOV)	An indicator variable equal to one if government spending is greater than the sample median value, and zero otherwise. Government spending is computed as the percentage of industry sales that are attributed to government purchases using data from the Benchmark Input-Output Accounts.
Government client (GOV_CLIENT)	An indicator variable equal to one for firms that have government as their major customer, and zero otherwise
Lobbying power (HIGHLOBBYIST)	An indicator variable equal to one if lobbying expenditure during the fiscal year (LOBBYIST) is greater than the sample median value, and zero otherwise.
Managerial Ability (MA)	Demerjian et al. (2012) proxy of managerial ability (MA) using the efficiency scores.
Managerial Ability (MAR)	Demerjian et al. (2012) proxy of managerial ability (MA) using the efficiency ranking.
General Managerial Skills (GAII)	Custódio et al. (2013) proxy of CEO generality index (GAI) which distinguishes between generalist vs specialist CEOs.

The table presents the mnemonics and description of the variables used in the core analysis.

Table 2: Descriptive statistics

	Mean	SD	25P	Median	75P	Obs.
$CASH_t$	0.217	0.225	0.044	0.132	0.322	148515
DEXPOSURE	0.226	0.239	0.000	0.351	0.603	148515
DRISK	0.035	0.026	0.000	0.020	0.200	148515
DSENTIMENT	-0.026	0.014	0.000	0.000	0.300	148515
SIZE	6.726	1.910	5.396	6.652	7.968	148515
TQ	1.887	1.778	0.925	1.372	2.193	148515
ROA	0.018	0.070	0.011	0.028	0.043	148515
BLEV	0.223	0.268	0.012	0.181	0.339	148515
EVOL	0.015	0.031	0.004	0.008	0.016	126782
DIV	0.382	0.486	0.000	0.000	1.000	148515
CAPEX	0.184	0.627	0.059	0.122	0.233	148515
TANG	0.229	0.223	0.064	0.148	0.320	148515
CONST	0.369	1.363	-1.161	-0.449	0.328	145278
HHI	0.205	0.327	0.002	0.028	0.244	147701
RETURN	-0.004	0.311	-0.126	0.015	0.138	143270
FAGE	1.451	0.993	0.915	1.658	2.225	143305
DUALITY	0.194	0.395	0.000	0.000	0.000	148515
AGE	3.973	0.142	3.892	3.989	4.078	125129
GENDER	0.749	0.950	0.000	1.000	1.000	148515
TENURE	1.724	1.130	0.693	1.609	2.565	148515
COMPENS	7.422	1.099	6.701	7.365	8.118	135730
FINCRISIS	0.083	0.276	0.000	0.000	0.000	148515
OPTIMISM	0.704	0.456	0.000	1.000	1.000	148515
ΔGDP	9.519	0.101	9.448	9.543	9.597	148515
LnEXP	7.260	0.197	7.075	7.202	7.423	148515
FEDRATE	2.753	2.252	0.522	2.144	5.247	148515
BONDYIELD	4.196	1.227	3.461	4.287	4.771	148515
CBS	109.690	101.785	49.662	84.618	131.814	148515
LENDRATE	5.817	2.194	4.000	5.157	8.250	148515
LOANNFCs	8.679	0.320	8.399	8.674	8.999	148515
VXO	23.453	10.866	15.619	22.051	27.773	148515
SMI	22.807	1.251	22.020	23.220	23.520	148515
CCI	90.572	28.760	70.433	91.200	110.333	148515
ICI	3.927	14.009	-3.200	6.200	11.200	148515
EPUBBD	54.025	7.689	50.933	55.067	59.367	148515

The table reports the summary statistics for the main variables used in the analysis. The sample comprises 5,209 U.S. firms (excluding utilities and financials) over the period 2002–2019.

Table 3: Correlations matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	$CASH_t$	1.000																					
2	DEXPOSURE	0.019*	1.000																				
3	DRISK	0.012*	0.736*	1.000																			
4	DSENTIMENT	0.018*	0.833*	0.837*	1.000																		
5	SIZE	-0.430*	-0.012*	-0.014*	0.003	1.000																	
6	TQ	0.397*	0.011*	0.020*	-0.007	-0.192*	1.000																
7	ROA	0.357*	-0.017*	-0.025*	-0.001	0.344*	-0.162*	1.000															
8	BLEV	-0.298*	-0.002	-0.001	-0.001	0.215*	0.024*	-0.092*	1.000														
9	EVOL	0.207*	0.001	0.001	0.002	-0.243*	0.165*	-0.391*	0.055*	1.000													
10	DIV	-0.290*	-0.006	-0.007*	0.000	0.430*	-0.091*	0.207*	0.087*	-0.097*	1.000												
11	CAPEX	0.092*	0.001	-0.000	0.000	-0.067*	0.072*	-0.029*	-0.049*	0.019*	-0.057*	1.000											
12	TANG	-0.407*	0.003	0.004	-0.003	0.250*	-0.162*	0.137*	0.223*	-0.001	0.181*	-0.076*	1.000										
13	CONST	-0.152*	0.015*	0.020*	-0.004	0.219*	-0.085*	-0.118*	0.207*	0.028*	0.112*	-0.073*	0.741*	1.000									
14	HHI	-0.288*	-0.005	-0.006	0.001	0.344*	-0.121*	0.148*	0.096*	-0.083*	0.253*	-0.047*	0.081*	-0.004	1.000								
15	RETURN	0.016*	0.003	0.003	-0.002	0.023*	0.136*	0.093*	-0.034*	-0.033*	-0.002	-0.014*	-0.018*	-0.035*	0.009*	1.000							
16	FAGE	-0.136*	-0.003	-0.008*	-0.002	0.259*	-0.074*	0.083*	0.061*	-0.050*	0.168*	-0.042*	0.012*	-0.013*	0.091*	0.023*	1.000						
17	DUALITY	-0.118*	-0.004	-0.005	-0.000	0.196*	-0.031*	0.125*	-0.004	-0.062*	0.100*	-0.021*	0.032*	-0.008*	0.104*	0.016*	0.112*	1.000					
18	AGE	-0.107*	-0.001	-0.001	0.001	0.124*	-0.066*	0.003	0.039*	-0.023*	0.135*	-0.081*	0.061*	0.066*	0.071*	-0.004	0.083*	0.210*	1.000				
19	GENDER	-0.229*	-0.009*	-0.011*	0.001	0.393*	-0.060*	0.239*	0.017*	-0.134*	0.192*	-0.043*	0.036*	-0.016*	0.191*	0.031*	0.246*	0.465*	0.083*	1.000			
20	TENURE	0.102*	0.007*	0.005	-0.002	-0.132*	0.005	-0.110*	0.002	0.065*	-0.046*	0.012*	-0.009*	0.011*	-0.100*	-0.011*	0.280*	-0.148*	0.283*	-0.530*	1.000		
21	COMPENS	-0.120*	0.006	0.005	-0.006	0.560*	0.024*	0.088*	0.140*	-0.057*	0.196*	-0.041*	0.027*	0.076*	0.152*	-0.010*	0.141*	0.337*	0.143*	0.046*	0.196*	1.000	
22	OPTIMISM	0.143*	0.006	0.007*	-0.000	-0.267*	0.108*	-0.126*	-0.016*	0.086*	-0.131*	0.039*	-0.021*	-0.006	-0.133*	-0.047*	-0.142*	-0.298*	0.000	-0.577*	0.349*	-0.008	1.000

The table presents the unconditional correlation coefficient between any pair of variables. * Indicates significance at 1%.

Table 4: Pandemic disease exposure and cash holding.

	Dependent Variable: $CASH_{t+1}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	0.106***	0.082***	0.305***	0.423***								
	(0.006)	(0.002)	(0.015)	(0.013)								
DRISK					0.287***	0.162***	0.151***	0.210***				
					(0.077)	(0.025)	(0.008)	(0.007)				
DSENTIMENT									0.658***	0.283***	0.305***	0.423***
									(0.084)	(0.015)	(0.015)	(0.013)
SIZE		-0.008***	-0.011***	-0.003***		-0.008***	-0.011***	-0.003***		-0.008***	-0.011***	-0.003***
		(0.001)	(0.002)	(0.000)		(0.001)	(0.002)	(0.000)		(0.001)	(0.002)	(0.000)
TQ		0.003***	0.002***	-0.000		0.003***	0.002***	-0.000		0.003***	0.002***	-0.000
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
ROA		0.042***	0.061***	0.048***		0.042***	0.061***	0.048***		0.042***	0.061***	0.048***
		(0.014)	(0.021)	(0.017)		(0.014)	(0.021)	(0.017)		(0.014)	(0.021)	(0.017)
BLEV		-0.019***	-0.015***	-0.006***		-0.019***	-0.015***	-0.006***		-0.019***	-0.015***	-0.006***
		(0.002)	(0.003)	(0.001)		(0.002)	(0.003)	(0.001)		(0.002)	(0.003)	(0.001)
EVOL		-0.007	-0.025**	0.002		-0.007	-0.025**	0.002		-0.007	-0.025**	0.002
		(0.011)	(0.012)	(0.009)		(0.011)	(0.012)	(0.009)		(0.011)	(0.012)	(0.009)
DIV		0.001	0.001	0.000		0.001	0.001	0.000		0.001	0.001	0.000
		(0.001)	(0.001)	(0.000)		(0.001)	(0.001)	(0.000)		(0.001)	(0.001)	(0.000)
CAPEX		-0.000	0.008**	0.001		-0.000	0.008**	0.001		-0.000	0.008**	0.001
		(0.000)	(0.003)	(0.001)		(0.000)	(0.003)	(0.001)		(0.000)	(0.003)	(0.001)
TANG		-0.156***	-0.146***	-0.005		-0.156***	-0.146***	-0.005		-0.156***	-0.146***	-0.005
		(0.013)	(0.012)	(0.005)		(0.013)	(0.012)	(0.005)		(0.013)	(0.012)	(0.005)
CONST		0.006***	0.005**	-0.002**		0.005***	0.005**	-0.002**		0.006***	0.005**	-0.002**
		(0.001)	(0.002)	(0.001)		(0.001)	(0.002)	(0.001)		(0.001)	(0.002)	(0.001)
HHI		0.001	0.001	0.002***		0.001	0.001	0.002***		0.001	0.001	0.002***
		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
RETURN		0.000	0.002	0.001		0.000	0.002	0.001		0.000	0.002	0.001
		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
FAGE		-0.003**	-0.003	-0.001		-0.003**	-0.003	-0.001		-0.003**	-0.003	-0.001
		(0.001)	(0.002)	(0.001)		(0.001)	(0.002)	(0.001)		(0.001)	(0.002)	(0.001)
$CASH_{t+2}$		0.712***	0.706***	0.450***		0.713***	0.706***	0.450***		0.712***	0.706***	0.450***
		(0.014)	(0.020)	(0.009)		(0.014)	(0.020)	(0.009)		(0.014)	(0.020)	(0.009)
$CASH_{t+3}$		0.050***	0.058***	0.044***		0.050***	0.058***	0.044***		0.050***	0.058***	0.044***
		(0.010)	(0.014)	(0.012)		(0.010)	(0.014)	(0.012)		(0.010)	(0.014)	(0.012)
DUALITY			-0.001	-0.001			-0.001	-0.001			-0.001	-0.001
			(0.001)	(0.000)			(0.001)	(0.000)			(0.001)	(0.000)
AGE			-0.000	0.000			-0.000	0.000			-0.000	0.000
			(0.000)	(0.000)			(0.000)	(0.000)			(0.000)	(0.000)
GENDER			-0.000	0.001			-0.000	0.001			-0.000	0.001
			(0.001)	(0.001)			(0.001)	(0.001)			(0.001)	(0.001)
TENURE			0.000	0.000			0.000	0.000			0.000	0.000
			(0.000)	(0.000)			(0.000)	(0.000)			(0.000)	(0.000)
COMPENS			-0.000	-0.000			-0.000	-0.000			-0.000	-0.000
			(0.000)	(0.000)			(0.000)	(0.000)			(0.000)	(0.000)
OPTIMISM			0.001	-0.000			0.001	-0.000			0.001	-0.000
			(0.001)	(0.000)			(0.001)	(0.000)			(0.001)	(0.000)
ΔGDP				0.000				0.000				0.000
				(0.000)				(0.000)				(0.000)

LnEXP				-0.003***				-0.003***				-0.003***
				(0.001)				(0.001)				(0.001)
FEDRATE				-1.300***				-1.300***				-1.300***
				(0.260)				(0.260)				(0.260)
BONDYIELD				-0.019				-0.019				-0.019
				(0.019)				(0.019)				(0.019)
CBS				0.002***				0.002***				0.002***
				(0.000)				(0.000)				(0.000)
LENDRATE				1.184***				1.184***				1.184***
				(0.207)				(0.207)				(0.207)
LOANNFCs				0.001***				0.001***				0.001***
				(0.000)				(0.000)				(0.000)
VXO				-0.022***				-0.022***				-0.022***
				(0.004)				(0.004)				(0.004)
SMI				0.033***				0.033***				0.033***
				(0.009)				(0.009)				(0.009)
CCI				0.010***				0.010***				0.010***
				(0.002)				(0.002)				(0.002)
ICI				0.005***				0.005***				0.005***
				(0.001)				(0.001)				(0.001)
EPUBBD				0.011**				0.011**				0.011**
				(0.005)				(0.005)				(0.005)
_cons	0.218***	0.153***	0.171***	-1.190***	0.218***	0.153***	0.171***	-1.190***	0.218***	0.153***	0.171***	-1.190***
	(0.012)	(0.014)	(0.015)	(0.305)	(0.012)	(0.014)	(0.015)	(0.305)	(0.012)	(0.014)	(0.015)	(0.305)
All firm controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
All CEO controls	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Macro controls	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	148515	126782	125129	125129	148515	126782	125129	125129	148515	126782	125129	125129
R-squared	0.841	0.948	0.937	0.958	0.841	0.948	0.937	0.958	0.841	0.948	0.937	0.958
N_clust	211	210	194	194	211	210	194	194	211	210	194	194

Table 4 reports the estimation results of the effect of disease exposure on cash holding. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. All variable definitions are as described in Table 1. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 5: Pandemic disease exposure and cash holding – controlling for prior experience.

PANEL A

	Dependent Variable: $CASH_{t+1}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	0.113***	0.154***	0.279***	0.338***								
	(0.007)	(0.004)	(0.031)	(0.016)								
DRISK					0.282***	0.449***	0.138***	0.168***				
					(0.078)	(0.129)	(0.015)	(0.008)				
DSENTIMENT									0.681***	0.291***	0.279***	0.338***
									(0.089)	(0.066)	(0.031)	(0.016)
EBOLA_EXPOSURE	0.037***	0.021***	0.033***	0.041***	0.037***	0.020***	0.033***	0.041***	0.038***	0.020***	0.033***	0.041***
	(0.003)	(0.003)	(0.011)	(0.007)	(0.003)	(0.003)	(0.011)	(0.007)	(0.003)	(0.003)	(0.011)	(0.007)
H1N1_EXPOSURE	0.008**	0.011***	0.003***	0.007***	0.008*	0.011***	0.003***	0.007***	0.008*	0.011***	0.003***	0.007***
	(0.004)	(0.003)	(0.000)	(0.001)	(0.005)	(0.003)	(0.000)	(0.001)	(0.005)	(0.003)	(0.000)	(0.001)
ZIKA_EXPOSURE	-0.005***	-0.009***	-0.005***	-0.005***	-0.005***	-0.010***	-0.005***	-0.005***	-0.005***	-0.009***	-0.005***	-0.005***
	(0.002)	(0.003)	(0.000)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
SARS_EXPOSURE	-0.005	-0.006	-0.011	0.002	-0.006	-0.006	-0.011	0.002	-0.006	-0.005	-0.011	0.002
	(0.007)	(0.005)	(0.010)	(0.006)	(0.007)	(0.005)	(0.011)	(0.006)	(0.007)	(0.005)	(0.010)	(0.006)
SIZE		-0.040***	-0.047***	-0.012***		-0.040***	-0.047***	-0.012***		-0.040***	-0.047***	-0.012***
		(0.005)	(0.006)	(0.001)		(0.005)	(0.006)	(0.001)		(0.005)	(0.006)	(0.001)
TQ		0.010***	0.010***	0.003***		0.010***	0.010***	0.003***		0.010***	0.010***	0.003***
		(0.001)	(0.001)	(0.000)		(0.001)	(0.001)	(0.000)		(0.001)	(0.001)	(0.000)
_cons	0.219***	0.600***	0.655***	-7.377***	0.219***	0.600***	0.655***	-7.377***	0.219***	0.600***	0.655***	-7.377***
	(0.012)	(0.050)	(0.066)	(1.895)	(0.012)	(0.050)	(0.066)	(1.895)	(0.012)	(0.050)	(0.066)	(1.895)
All firm controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
All CEO controls	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Macro controls	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	132721	107309	52869	50604	132721	107309	52869	50604	132721	107309	52869	50604
R-squared	0.841	0.862	0.829	0.935	0.841	0.862	0.829	0.935	0.841	0.862	0.829	0.935
N_clust	211	210	196	196	211	210	196	196	211	210	196	196

PANEL B

	Dependent Variable: $CASH_{t+1}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	0.106***	0.142***	0.281***	0.341***								
	(0.006)	(0.003)	(0.032)	(0.015)								
DRISK					0.287***	0.427***	0.140***	0.170***				
					(0.077)	(0.122)	(0.016)	(0.008)				
DSENTIMENT									0.658***	0.270***	0.281***	0.341***
									(0.084)	(0.064)	(0.032)	(0.015)
EBOLA_EXPOSURE	0.017***	0.009***	0.029**	0.214**	0.017***	0.009***	0.029**	0.214**	0.017***	0.009***	0.029**	0.214**
	(0.003)	(0.003)	(0.012)	(0.092)	(0.003)	(0.003)	(0.012)	(0.092)	(0.003)	(0.003)	(0.012)	(0.092)
H1N1_EXPOSURE	0.010***	0.013***	0.031***	0.757**	0.010***	0.013***	0.031***	0.757**	0.010***	0.013***	0.031***	0.757**
	(0.001)	(0.001)	(0.003)	(0.314)	(0.001)	(0.001)	(0.003)	(0.314)	(0.001)	(0.001)	(0.003)	(0.314)
ZIKA_EXPOSURE	-0.009**	-0.025**	-0.010**	-0.032**	-0.009**	-0.025**	-0.010**	-0.032**	-0.009**	-0.025**	-0.010**	-0.032**
	(0.004)	(0.011)	(0.004)	(0.015)	(0.004)	(0.011)	(0.004)	(0.015)	(0.004)	(0.011)	(0.004)	(0.015)
MERS_EXPOSURE	0.006***	0.013***	0.035***	0.351***	0.006***	0.013***	0.035***	0.351***	0.006***	0.013***	0.035***	0.351***
	(0.002)	(0.002)	(0.006)	(0.056)	(0.002)	(0.002)	(0.006)	(0.056)	(0.002)	(0.002)	(0.006)	(0.056)
SARS_EXPOSURE	-0.015	-0.008	-0.010	-0.507	-0.015	-0.008	-0.010	-0.507	-0.015	-0.008	-0.010	-0.507
	(0.015)	(0.017)	(0.032)	(0.388)	(0.015)	(0.017)	(0.032)	(0.388)	(0.015)	(0.017)	(0.032)	(0.388)
SIZE		-0.040***	-0.047***	-0.012***		-0.040***	-0.047***	-0.012***		-0.040***	-0.047***	-0.012***
		(0.005)	(0.006)	(0.001)		(0.005)	(0.006)	(0.001)		(0.005)	(0.006)	(0.001)
TQ		0.010***	0.010***	0.003***		0.010***	0.010***	0.003***		0.010***	0.010***	0.003***
		(0.001)	(0.001)	(0.000)		(0.001)	(0.001)	(0.000)		(0.001)	(0.001)	(0.000)
_cons	0.218***	0.600***	0.654***	-7.332***	0.218***	0.600***	0.654***	-7.332***	0.218***	0.600***	0.654***	-7.332***
	(0.012)	(0.050)	(0.066)	(1.909)	(0.012)	(0.050)	(0.066)	(1.909)	(0.012)	(0.050)	(0.066)	(1.909)
All firm controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
All CEO controls	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Macro controls	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	132721	107309	52869	50604	132721	107309	52869	50604	132721	107309	52869	50604
R-squared	0.841	0.862	0.829	0.935	0.841	0.862	0.829	0.935	0.841	0.862	0.829	0.935
N_clust	211	210	196	195	211	210	196	195	211	210	196	195

Table 5 reports the estimation results of the effect of disease exposure on cash holding after controlling for various pandemics. The measures of the pandemics in PANEL A are measured using the linguistic algorithms on the Conference Call, while the measures in PANEL B uses Dummy Variables to capture the timing of the various pandemics. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Pandemic disease exposure and cash holding: 2-step IV

	1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage
	DEXPOSURE	$CASH_{t+1}$	DEXPOSURE	$CASH_{t+1}$	DEXPOSURE	$CASH_{t+1}$
INST DEXPOSURE		0.142***		0.138***		0.135***
		(0.042)		(0.041)		(0.039)
AFFECTED_SHARE	0.210***		0.187***		0.210***	
	(0.023)		(0.023)		(0.023)	
COMM._SHARE	0.086***		0.084***		0.085***	
	(0.024)		(0.024)		(0.023)	
PRESENCE_SHARE	0.064***		0.087***		0.080***	
	(0.002)		(0.002)		(0.002)	
CUSTOMER_SHARE	0.067***		0.067***		0.066***	
	(0.023)		(0.023)		(0.023)	
TEAMWORK_SHARE	0.037***		0.048***		0.045***	
	(0.000)		(0.000)		(0.000)	
SIZE	0.020**	-0.020***	0.013	-0.022***	0.010	-0.022***
	(0.009)	(0.003)	(0.010)	(0.004)	(0.010)	(0.004)
TQ	0.032***	0.030***	0.022***	0.033***	0.011	0.036***
	(0.007)	(0.002)	(0.007)	(0.002)	(0.007)	(0.003)
ROA	-0.424*	-0.119	-0.448**	-0.106	-0.155	-0.185
	(0.226)	(0.124)	(0.227)	(0.119)	(0.239)	(0.121)
BLEV	-0.055	-0.146***	-0.049	-0.151***	-0.110**	-0.138***
	(0.050)	(0.027)	(0.051)	(0.028)	(0.051)	(0.028)
EVOL	0.447	0.338	0.640*	0.278	0.726**	0.312
	(0.350)	(0.328)	(0.346)	(0.335)	(0.360)	(0.315)
DIV	-0.072***	-0.017**	-0.071***	-0.017**	-0.076***	-0.016**
	(0.024)	(0.008)	(0.024)	(0.008)	(0.024)	(0.008)
CAPEX	0.120***	0.017*	0.113***	0.018*	0.101**	0.024**
	(0.043)	(0.010)	(0.041)	(0.010)	(0.041)	(0.010)
TANG	-0.250*	-0.272***	-0.267**	-0.263***	-0.260**	-0.262***
	(0.133)	(0.040)	(0.131)	(0.039)	(0.130)	(0.039)
CONST	0.043**	0.027***	0.046**	0.026***	0.046**	0.025***
	(0.020)	(0.007)	(0.020)	(0.007)	(0.020)	(0.007)
HHI	-0.049	-0.039***	-0.047	-0.039***	-0.039	-0.041***
	(0.035)	(0.009)	(0.034)	(0.009)	(0.034)	(0.009)
RETURN	-0.013	-0.002	-0.013	-0.004	0.009	-0.013***
	(0.009)	(0.003)	(0.009)	(0.003)	(0.009)	(0.003)
FAGE	0.105***	-0.009*	0.089***	-0.005	-0.025	0.014***
	(0.011)	(0.005)	(0.012)	(0.005)	(0.018)	(0.005)
_cons	4.835***	-0.324	4.830***	-0.327*	7.745***	-1.118***
	(0.170)	(0.200)	(0.181)	(0.194)	(0.468)	(0.306)
All firm controls	Yes	Yes	Yes	Yes	Yes	Yes
All CEO controls	No	No	Yes	Yes	Yes	Yes
Macro controls	No	No	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	124849	124849	124849	124849	124849	124849
N_clust	195	195	195	195	195	195
K-P F-stats		15.760		15.942		15.282
K-P LM stats		19.300		19.415		18.063
C-D F-stats		79.349		80.757		92.337
Hansen J statistic		8.431		8.047		8.173
Hansen J p-value		0.134		0.154		0.147

Table 6 reports the two-stage IV estimation results of the effects of disease exposure on cash holding. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 7: Covid on Cash Holding - Falsification Test

	Dependent Variable: CASH							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DEXPOSURE	0.238	0.152	0.027	-0.154				
	(0.192)	(0.175)	(0.163)	(0.138)				
DRISK					0.270	0.128	0.007	-0.037
					(0.178)	(0.143)	(0.039)	(0.033)
SIZE		-0.008***	-0.012***	-0.003***		-0.008***	-0.012***	-0.003***
		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
TQ		0.003***	0.002***	-0.000		0.003***	0.002***	-0.000
		(0.000)	(0.001)	(0.000)		(0.000)	(0.001)	(0.000)
ROA		0.020	0.083***	0.077***		0.020	0.083***	0.077***
		(0.022)	(0.025)	(0.018)		(0.022)	(0.025)	(0.018)
BLEV		-0.024***	-0.015***	-0.002		-0.024***	-0.015***	-0.002
		(0.004)	(0.005)	(0.004)		(0.004)	(0.005)	(0.004)
EVOL		0.030	0.006	0.036		0.030	0.006	0.036
		(0.027)	(0.054)	(0.039)		(0.027)	(0.054)	(0.039)
DIV		0.002	0.004**	0.002*		0.002	0.004**	0.002*
		(0.001)	(0.002)	(0.001)		(0.001)	(0.002)	(0.001)
CAPEX		0.007***	0.011***	0.000		0.007***	0.011***	0.000
		(0.003)	(0.003)	(0.004)		(0.003)	(0.003)	(0.004)
TANG		-0.153***	-0.157***	-0.017*		-0.153***	-0.157***	-0.017*
		(0.010)	(0.013)	(0.010)		(0.010)	(0.013)	(0.010)
CONST		0.005***	0.009***	0.002		0.005***	0.009***	0.002
		(0.001)	(0.002)	(0.002)		(0.001)	(0.002)	(0.002)
HHI		0.001	0.002*	0.002**		0.001	0.002*	0.002**
		(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
RETURN		0.001	0.003*	-0.000		0.001	0.003*	-0.000
		(0.002)	(0.001)	(0.001)		(0.002)	(0.001)	(0.001)
FAGE		0.000	0.002***	0.003		0.000	0.002***	0.003
		(0.001)	(0.001)	(0.002)		(0.001)	(0.001)	(0.002)
DUALITY			0.000	0.001			0.000	0.001
			(0.001)	(0.001)			(0.001)	(0.001)
_cons	0.212***	0.133***	0.150***	-0.029	0.212***	0.133***	0.150***	-0.029
	(0.007)	(0.011)	(0.013)	(0.048)	(0.007)	(0.011)	(0.013)	(0.048)
All firm controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
All CEO controls	No	No	Yes	Yes	No	No	Yes	Yes
Macro controls	No	No	No	Yes	No	No	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	49505	40717	38527	38526	49505	40717	38527	38526
Obs.	0.847	0.952	0.941	0.961	0.847	0.952	0.941	0.961
R-squared	210	210	210	210	210	210	210	210

Table 7 reports the Falsification Test of the effect of randomized disease exposure on cash holding. We follow a four-step process in the randomization test. First, we randomly assign firms to the 3 equal groups. Next, we keep only one of the groups as the falsified sample. Third, we then assign the falsified sample to random industry groupings. Lastly, firms are randomly assigned to quarter-years in which the various disease exposure manifested. Standard error robust to heteroscedasticity and clustering at the industry level (randomly grouped) are given in parentheses. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 8: Pandemic disease exposure, government support and cash holding.

	Dependent Variable: $CASH_{t+1}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	0.129***	0.141***					0.152***	0.068***				
	(0.005)	(0.003)					(0.005)	(0.002)				
DEXPOSURE × HIGHGOVSP	0.904***	0.892***										
	(0.158)	(0.159)										
DRISK			0.346***	0.381***					0.500***	0.124***		
			(0.132)	(0.104)					(0.166)	(0.022)		
DRISK × HIGHGOVSP			0.403***	0.368***								
			(0.138)	(0.137)								
DSENTIMENT					0.260***	0.277***					0.624***	0.211***
					(0.085)	(0.065)					(0.020)	(0.011)
DSENTIMENT × HIGHGOVSP					0.595***	0.576***						
					(0.082)	(0.064)						
DEXPOSURE × GOV_CLIENT							0.121***	0.214***				
							(0.022)	(0.020)				
DRISK × GOV_CLIENT									0.364**	0.161***		
									(0.166)	(0.029)		
DSENTIMENT × GOV_CLIENT											0.898***	0.493***
											(0.022)	(0.013)
HIGHGOV	0.013**	0.010*	0.013**	0.010*	0.013**	0.010*						
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)						
GOVT_CLIENT							0.001	-0.000	0.001	-0.000	0.001	-0.000
							(0.003)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)
SIZE	-0.041***	-0.040***	-0.041***	-0.040***	-0.041***	-0.040***	-0.041***	-0.009***	-0.041***	-0.009***	-0.041***	-0.009***
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)
TQ	0.009***	0.010***	0.009***	0.010***	0.009***	0.010***	0.009***	0.003***	0.009***	0.003***	0.009***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
ROA	0.067*	0.062*	0.067*	0.062*	0.066*	0.062*	0.067*	0.043***	0.067*	0.043***	0.067*	0.043***
	(0.035)	(0.033)	(0.035)	(0.033)	(0.035)	(0.033)	(0.035)	(0.012)	(0.035)	(0.012)	(0.035)	(0.012)
BLEV	-0.060***	-0.067***	-0.060***	-0.067***	-0.060***	-0.067***	-0.060***	-0.020***	-0.060***	-0.020***	-0.060***	-0.020***
	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.002)	(0.009)	(0.002)	(0.009)	(0.002)
DIV	-0.002	-0.003	-0.002	-0.003	-0.002	-0.003	-0.002	0.001	-0.002	0.000	-0.002	0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)
CAPEX	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000***	-0.000	-0.000***	-0.000	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TANG	-0.456***	-0.459***	-0.456***	-0.459***	-0.456***	-0.459***	-0.457***	-0.154***	-0.457***	-0.154***	-0.457***	-0.154***
	(0.050)	(0.047)	(0.050)	(0.047)	(0.050)	(0.047)	(0.050)	(0.013)	(0.050)	(0.013)	(0.050)	(0.013)
CONST	0.016***	0.017***	0.016***	0.017***	0.016***	0.017***	0.016***	0.006***	0.016***	0.006***	0.016***	0.006***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)
FAGE	-0.008**	-0.007**	-0.008**	-0.007**	-0.008**	-0.007**	-0.008**	-0.003**	-0.008**	-0.003**	-0.008**	-0.003**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)
DUALITY	-0.002**	-0.001*	-0.002**	-0.001*	-0.002**	-0.001*	-0.002**	-0.001	-0.002**	-0.001	-0.002**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
_cons	0.572***	-3.158	0.572***	-3.158	0.572***	-3.159	0.578***	0.053	0.578***	0.053	0.578***	0.053
	(0.053)	(2.248)	(0.053)	(2.248)	(0.053)	(2.248)	(0.055)	(0.570)	(0.055)	(0.570)	(0.055)	(0.570)
All firm/CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	102957	112383	102957	112383	102957	112383	102957	106172	102957	106172	102957	106172
R-squared	0.866	0.861	0.866	0.861	0.866	0.861	0.866	0.947	0.866	0.947	0.866	0.947
N_clust	210	211	210	211	210	211	210	211	210	211	210	211

Table 8 reports the estimation results of the effect of government support on the disease exposure-cash holding nexus. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Pandemic disease exposure, lobbying and cash holding.

	Dependent Variable: $CASH_{t+1}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	0.987***	0.626***					0.564***	0.356***				
	(0.238)	(0.130)					(0.107)	(0.066)				
DEXPOSURE × LOBBYIST	-0.858***	-0.499***										
	(0.240)	(0.131)										
DRISK			0.495***	0.541***					0.447**	0.362***		
			(0.171)	(0.211)					(0.216)	(0.131)		
DRISK × LOBBYIST			-0.668***	-0.593***								
			(0.231)	(0.179)								
DSENTIMENT					0.860***	0.858***					0.758***	0.452***
					(0.037)	(0.040)					(0.149)	(0.113)
DSENTIMENT × LOBBYIST					-0.601***	-0.580***						
					(0.082)	(0.063)						
DEXPOSURE × HIGH LOBBYIST							-0.433***	-0.285***				
							(0.105)	(0.064)				
DRISK × HIGH LOBBYIST									-0.237***	-0.653***		
									(0.016)	(0.101)		
DSENTIMENT × HIGH LOBBYIST											-0.432***	-0.265**
											(0.151)	(0.107)
LOBBYIST	0.261*	-0.232	0.261*	-0.232	0.260*	-0.232						
	(0.148)	(0.637)	(0.148)	(0.637)	(0.148)	(0.637)						
HIGH LOBBYIST							0.261*	-0.169	0.261*	-0.169	0.260*	-0.169
							(0.148)	(0.544)	(0.148)	(0.544)	(0.148)	(0.544)
SIZE	-0.041***	-0.040***	-0.041***	-0.040***	-0.041***	-0.040***	-0.041***	-0.039***	-0.041***	-0.039***	-0.041***	-0.039***
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)
TQ	0.009***	0.010***	0.009***	0.010***	0.009***	0.010***	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA	0.067*	0.062*	0.067*	0.062*	0.067*	0.062*	0.067*	0.043	0.067*	0.043	0.067*	0.043
	(0.035)	(0.033)	(0.035)	(0.033)	(0.035)	(0.033)	(0.035)	(0.028)	(0.035)	(0.028)	(0.035)	(0.028)
BLEV	-0.060***	-0.067***	-0.060***	-0.067***	-0.060***	-0.067***	-0.060***	-0.050***	-0.060***	-0.050***	-0.060***	-0.050***
	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.006)	(0.009)	(0.006)	(0.009)	(0.006)
DIV	-0.002	-0.003	-0.002	-0.003	-0.002	-0.003	-0.002	-0.003	-0.002	-0.003	-0.002	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
CAPEX	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TANG	-0.457***	-0.459***	-0.457***	-0.459***	-0.457***	-0.459***	-0.457***	-0.396***	-0.457***	-0.396***	-0.457***	-0.396***
	(0.050)	(0.048)	(0.050)	(0.048)	(0.050)	(0.048)	(0.050)	(0.046)	(0.050)	(0.046)	(0.050)	(0.046)
CONST	0.016***	0.017***	0.016***	0.017***	0.016***	0.017***	0.016***	0.013***	0.016***	0.013***	0.016***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
FAGE	-0.008**	-0.007**	-0.008**	-0.007**	-0.008**	-0.007**	-0.008**	-0.006*	-0.008**	-0.006*	-0.008**	-0.006*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)
DUALITY	-0.002**	-0.001*	-0.002**	-0.001*	-0.002**	-0.001*	-0.002**	-0.001*	-0.002**	-0.001*	-0.002**	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
_cons	0.578***	-3.185	0.578***	-3.185	0.578***	-3.186	0.578***	-2.708	0.578***	-2.708	0.578***	-2.709
	(0.055)	(2.262)	(0.055)	(2.262)	(0.055)	(2.262)	(0.055)	(2.222)	(0.055)	(2.222)	(0.055)	(2.222)
All firm/CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	102957	112383	102957	112383	102957	112383	102957	112383	102957	112383	102957	112383
R-squared	0.866	0.861	0.866	0.861	0.866	0.861	0.866	0.868	0.866	0.868	0.866	0.868
N_clust	210	211	210	211	210	211	210	211	210	211	210	211

Table 9 reports the estimation results of the effect of lobbying on the disease exposure-cash holding nexus. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 10: Pandemic disease exposure and cash-flow sensitivity

	Dependent Variable: $\Delta CASH_t$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	0.021***	0.039***	0.312**	0.324***								
	(0.006)	(0.006)	(0.124)	(0.110)								
DEXPOSURE × EVOL	0.114***	0.141***	0.664***	0.679***								
	(0.093)	(0.099)	(0.205)	(0.181)								
DRISK					0.040***	0.029***	0.124*	0.131**				
					(0.009)	(0.009)	(0.063)	(0.066)				
DRISK × EVOL					0.238*	0.249*	1.347***	1.325***				
					(0.143)	(0.147)	(0.103)	(0.119)				
DSENTIMENT									0.265**	0.283**	0.270**	0.288**
									(0.111)	(0.121)	(0.104)	(0.115)
DSENTIMENT × EVOL									0.986***	0.995***	0.984***	0.993***
									(0.115)	(0.116)	(0.108)	(0.110)
EVOL	0.160***	0.154***	0.163***	0.156***	0.160***	0.154***	0.163***	0.156***	0.160***	0.154***	0.163***	0.156***
	(0.011)	(0.009)	(0.012)	(0.011)	(0.011)	(0.009)	(0.012)	(0.011)	(0.011)	(0.009)	(0.012)	(0.011)
SIZE	0.015***	0.015***	0.016***	0.017***	0.015***	0.015***	0.016***	0.017***	0.015***	0.015***	0.016***	0.017***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
TQ	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA	0.368***	0.321***	0.363***	0.314***	0.368***	0.321***	0.363***	0.314***	0.368***	0.321***	0.363***	0.314***
	(0.083)	(0.060)	(0.078)	(0.057)	(0.083)	(0.060)	(0.078)	(0.057)	(0.083)	(0.060)	(0.078)	(0.057)
DIV	-0.006***	-0.007***	-0.006***	-0.007***	-0.006***	-0.007***	-0.006***	-0.007***	-0.006***	-0.007***	-0.006***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TANG	-0.051***	-0.052***	-0.050***	-0.052***	-0.051***	-0.052***	-0.051***	-0.052***	-0.051***	-0.052***	-0.050***	-0.051***
	(0.017)	(0.016)	(0.016)	(0.016)	(0.017)	(0.016)	(0.016)	(0.016)	(0.017)	(0.016)	(0.016)	(0.016)
RETURN	0.016***	0.016***	0.017***	0.017***	0.016***	0.016***	0.017***	0.017***	0.016***	0.016***	0.017***	0.017***
	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)
DUALITY	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GENDER	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
OPTIMISM	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ΔBLEV		0.009		0.009		0.009		0.009		0.009		0.009
		(0.058)		(0.055)		(0.058)		(0.055)		(0.058)		(0.055)
ΔNWC		0.180***		0.186***		0.180***		0.186***		0.180***		0.186***
		(0.050)		(0.052)		(0.050)		(0.052)		(0.050)		(0.052)
CAPEX		-0.001*		-0.001**		-0.001*		-0.001**		-0.001*		-0.001*
		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)
_cons	-0.117***	-0.117***	-0.836	-0.888	-0.117***	-0.117***	-0.836	-0.888	-0.117***	-0.117***	-0.836	-0.888
	(0.030)	(0.032)	(0.649)	(0.696)	(0.030)	(0.032)	(0.649)	(0.696)	(0.030)	(0.032)	(0.649)	(0.696)
All firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	106836	104066	97760	95206	106836	104066	97760	95206	106836	104066	97760	95206
R-squared	0.142	0.160	0.143	0.162	0.142	0.160	0.143	0.162	0.142	0.160	0.143	0.162
N_clust	211	210	210	209	211	210	210	209	211	210	210	209

Table 10 reports the estimation results of the effect of disease exposure on cash-flow sensitivity. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 11: Pandemic disease exposure, executive ability and cash holding.

	Dependent Variable: $CASH_{t+1}$								
	(1)	(2)	(5)	(6)	(7)	(10)	(11)	(12)	(15)
DEXPOSURE	0.159***	0.383***	0.339***						
	(0.021)	(0.044)	(0.018)						
DEXPOSURE × MA	-1.317***								
	(0.202)								
DEXPOSURE × MAR		-0.427***							
		(0.054)							
DEXPOSURE × GAII			0.106***						
			(0.002)						
DRISK				0.076***	0.127**	0.161***			
				(0.021)	(0.061)	(0.010)			
DRISK × MA				-0.274					
				(0.249)					
DRISK × MAR					-0.197***				
					(0.080)				
DRISK × GAII						0.156***			
						(0.002)			
DSENTIMENT							0.135***	0.411***	0.366***
							(0.007)	(0.015)	(0.017)
DSENTIMENT × MA							-1.625***		
							(0.064)		
DSENTIMENT × MAR								-0.562***	
								(0.023)	
DSENTIMENT × GAII									0.262***
									(0.002)
MA	-0.003			-0.003			-0.003		
	(0.004)			(0.004)			(0.004)		
MAR		-0.000			-0.000			-0.000	
		(0.002)			(0.002)			(0.002)	
GAI			-0.000			-0.000			-0.000
			(0.001)			(0.001)			(0.001)
SIZE	-0.011***	-0.011***	-0.012***	-0.011***	-0.011***	-0.012***	-0.011***	-0.011***	-0.012***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
TQ	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.041*	0.040*	0.072***	0.041*	0.040*	0.072***	0.041*	0.040*	0.072***
	(0.022)	(0.022)	(0.025)	(0.022)	(0.022)	(0.025)	(0.022)	(0.022)	(0.025)
BLEV	-0.008***	-0.008***	-0.004	-0.008***	-0.008***	-0.004	-0.008***	-0.008***	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
TANG	-0.110***	-0.110***	-0.102***	-0.110***	-0.110***	-0.102***	-0.110***	-0.110***	-0.102***
	(0.010)	(0.010)	(0.013)	(0.010)	(0.010)	(0.013)	(0.010)	(0.010)	(0.013)
_cons	-0.668	-0.662	-0.369	-0.668	-0.662	-0.369	-0.668	-0.662	-0.369
	(0.770)	(0.773)	(1.196)	(0.770)	(0.773)	(1.196)	(0.770)	(0.773)	(1.196)
All firm/CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	87031	87031	45067	87031	87031	45067	87031	87031	45067
R-squared	0.949	0.949	0.940	0.949	0.949	0.940	0.949	0.949	0.940
N_clust	208	208	189	208	208	189	208	208	189

Table 11 reports the estimation results of the effect of executive ability on the disease exposure-cash holding nexus. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 12: Pandemic disease exposure, CEO gender and cash holding.

	Dependent Variable: $CASH_{t+1}$											
	MALE						FEMALE					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	0.053	0.070					0.146***	0.089***				
	(0.055)	(0.073)					(0.005)	(0.007)				
DRISK			0.014	0.013					0.558***	0.469***		
			(0.028)	(0.039)					(0.014)	(0.021)		
DSENTIMENT					-0.075*	-0.118***					0.339***	0.135***
					(0.045)	(0.043)					(0.020)	(0.018)
SIZE	-0.046***	-0.044***	-0.046***	-0.044***	-0.046***	-0.044***	-0.030***	-0.031***	-0.030***	-0.031***	-0.030***	-0.031***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
TQ	0.011***	0.010***	0.011***	0.010***	0.011***	0.010***	0.009***	0.008***	0.009***	0.008***	0.009***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA	0.036	0.022	0.036	0.022	0.036	0.022	0.049*	0.031	0.049	0.031	0.049*	0.031
	(0.052)	(0.050)	(0.052)	(0.050)	(0.052)	(0.050)	(0.029)	(0.024)	(0.029)	(0.024)	(0.029)	(0.024)
BLEV	-0.064***	-0.049***	-0.064***	-0.049***	-0.064***	-0.049***	-0.068***	-0.052***	-0.068***	-0.052***	-0.068***	-0.052***
	(0.010)	(0.008)	(0.010)	(0.008)	(0.010)	(0.008)	(0.009)	(0.006)	(0.009)	(0.006)	(0.009)	(0.006)
CAPEX	-0.010**	-0.010***	-0.010**	-0.010***	-0.010**	-0.010***	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DUALITY	-0.002*	-0.001*	-0.002*	-0.001*	-0.002*	-0.001*	0.001	0.002	0.001	0.002	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)
_cons	0.627***	-1.404	0.627***	-1.404	0.627***	-1.404	0.588***	5.833**	0.588***	5.836**	0.588***	5.831**
	(0.061)	(2.930)	(0.061)	(2.930)	(0.061)	(2.930)	(0.055)	(2.828)	(0.055)	(2.828)	(0.055)	(2.828)
All firm/CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	93054	93054	93054	93054	93054	93054	32072	32072	32072	32072	32072	32072
r2	0.821	0.830	0.821	0.830	0.821	0.830	0.887	0.893	0.887	0.893	0.887	0.893
N_clust	201	201	201	201	201	201	201	201	201	201	201	201

PANEL B

	(1)	(2)	(3)	(4)	(5)	(6)
DEXPOSURE	0.069***	0.073***				
	(0.002)	(0.003)				
DEXPOSURE × MALE	-0.205***	-0.276***				
	(0.018)	(0.033)				
DRISK			0.156***	0.253***		
			(0.009)	(0.009)		
DRISK × MALE			-0.057*	-0.132***		
			(0.032)	(0.045)		
DSENTIMENT					0.210***	0.214***
					(0.005)	(0.006)
DSENTIMENT × MALE					-0.491***	-0.587***
					(0.019)	(0.016)
SIZE	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TQ	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.041***	0.043***	0.041***	0.043***	0.041***	0.043***
	(0.015)	(0.016)	(0.015)	(0.016)	(0.015)	(0.016)
BLEV	-0.019***	-0.017***	-0.019***	-0.017***	-0.019***	-0.017***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CAPEX	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DUALITY	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
_cons	0.158***	0.147	0.158***	0.146	0.158***	0.147
	(0.013)	(0.430)	(0.013)	(0.430)	(0.013)	(0.430)
All firm/CEO controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
All other controls	125126	125126	125126	125126	125126	125126
Obs.	0.947	0.948	0.947	0.948	0.947	0.948
R-squared	210	209	210	209	210	209

Table 12 reports the estimation results of the effect of CEO gender on the disease exposure-cash holding nexus. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01

Table 13: Implications for corporate investment and payout

	$CAPEX_{t+1}$						$PAYOUT_{t+1}$					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DEXPOSURE	-0.592***	-0.832***					-0.507***	-0.106***				
	(0.076)	(0.133)					(0.123)	(0.028)				
DEXPOSURE × CASH		0.046**						0.119***				
		(0.022)						(0.005)				
DRISK			-0.294***	-0.163***					-0.159***	-0.067***		
			(0.038)	(0.031)					(0.011)	(0.007)		
DRISK × CASH				0.018**						0.061***		
				(0.008)						(0.002)		
DSENTIMENT					0.592***	1.159***					-0.612***	-0.115
					(0.076)	(0.105)					(0.010)	(0.148)
DSENTIMENT × CASH						0.015***						0.013***
						(0.002)						(0.002)
CASH		-0.159***		-0.159***		-0.207***		-0.022***		-0.022***		-0.016***
		(0.042)		(0.042)		(0.027)		(0.005)		(0.005)		(0.003)
EVOL	0.046***	0.175***	0.046***	0.175***	0.046***	0.283***	0.007**	0.023***	0.007**	0.023***	0.007**	0.018***
	(0.013)	(0.041)	(0.013)	(0.041)	(0.013)	(0.071)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)
CAPEX	0.215***	0.207***	0.215***	0.207***	0.215***	-0.027	-0.002*	-0.002*	-0.002*	-0.002*	-0.002*	-0.000*
	(0.071)	(0.051)	(0.071)	(0.051)	(0.071)	(0.018)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
SIZE	0.008**	0.005	0.008**	0.005	0.008**	0.017**	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.002***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.008)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
TQ	0.013***	0.014***	0.013***	0.014***	0.013***	0.018***	0.001**	0.001***	0.001**	0.001***	0.001**	0.000*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
ROA	-0.232**	-0.177*	-0.232**	-0.177*	-0.232**	-0.127**	0.029**	0.029**	0.029**	0.029**	0.029**	0.018***
	(0.100)	(0.100)	(0.100)	(0.100)	(0.100)	(0.054)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.006)
BLEV	-0.046***	-0.047***	-0.046***	-0.047***	-0.046***	-0.096***	0.007*	0.006	0.007*	0.006	0.007*	0.003
	(0.009)	(0.007)	(0.009)	(0.007)	(0.009)	(0.019)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)
DIV	-0.002	-0.003	-0.002	-0.003	-0.002	-0.005*	0.015***	0.014***	0.015***	0.014***	0.015***	0.016***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TANG	0.024	0.003	0.024	0.003	0.024	-0.053**	-0.003	-0.002	-0.003	-0.002	-0.003	-0.008*
	(0.047)	(0.044)	(0.047)	(0.044)	(0.047)	(0.024)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.004)
CONST	-0.060***	-0.056***	-0.060***	-0.056***	-0.060***	-0.057***	-0.001	-0.001	-0.001	-0.001	-0.001	0.000
	(0.013)	(0.012)	(0.013)	(0.012)	(0.013)	(0.009)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.000)
HHI	-0.004*	-0.003*	-0.004*	-0.003*	-0.004*	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RETURN	-0.005*	-0.006**	-0.005*	-0.006**	-0.005*	-0.021***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
FAGE	-0.008*	-0.006**	-0.008*	-0.006**	-0.008*	-0.024***	0.003***	0.002***	0.003***	0.002***	0.003***	-0.001
	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DUALITY	0.002	0.001	0.002	0.001	0.002	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
OPTIMISM	0.008***	0.007***	0.008***	0.007***	0.008***	0.007***	0.000	0.000	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
_cons	0.113**	9.717	0.113**	9.717	0.113**	-5.565	0.040***	0.189	0.040***	0.189	0.040***	0.348
	(0.047)	(10.480)	(0.047)	(10.480)	(0.047)	(3.989)	(0.009)	(0.156)	(0.009)	(0.156)	(0.009)	(0.433)
All firm/CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	122845	116409	122845	116409	122284	111888	122638	111322	122638	111322	63870	105396
R-squared	0.458	0.479	0.458	0.479	0.458	0.101	0.402	0.399	0.402	0.399	0.402	0.308
N_clust	196	197	196	197	196	211	197	196	197	196	197	211

Table 13 reports the estimation results of the implications of the disease exposure-cash holding nexus on future investment and payout. *t+1* denotes the 4 quarter forward. Standard error robust to heteroscedasticity and clustering at industry level are given in parentheses. Significance indicators: * p < 0.10, ** p < 0.05, *** p < 0.01