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Pandemic effect on corporate financial asset holdings: Precautionary or return-chasing?

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ABSTRACT

This study empirically investigates whether and how the COVID-19 pandemic affects corporate financial asset holdings. We find that firms with higher pandemic exposure are less likely to hold financial assets. Mechanism analyses suggest that the return-chasing rationale dominates the precautionary motive concerning the pandemic effect on corporate financial asset holdings. Furthermore, firms prefer to liquidate highly liquid financial assets to fill the pandemic-induced liquidity shortage. This study contributes to the economic consequences of the COVID-19 pandemic regarding corporate portfolio choice, and sheds light on corporate resilience to crises.

1. Introduction

The novel coronavirus (COVID-19) pandemic, impacting almost every sphere of life and aspect of society (Murray, 2020), has exacerbated the uncertainty of the whole economy and drastically changed the enterprise operating environment (Baker et al., 2020; Berger and Demirgüç-Kunt, 2021; Zaremba et al., 2021). While the emerging literature shows significant efforts to demonstrate the widespread impacts of the COVID-19 pandemic on financial market participants, including the severe drop in return (Ding et al., 2021), the surge in volatility (Kocaarslan and Soytas, 2021), and the increase in bank system risk (Duan et al., 2021), research on corporate decisions in increasingly volatile financial markets during the pandemic remains scant. It is imperative to study how firms allocate the portfolio between real and financial assets to survive this public health crisis.

Theoretical predictions on how corporate financial asset holdings respond to the pandemic exposure are ambiguous. Prior studies argue that precautionary motive or return-chasing rationale are the main driving forces for corporate financial asset holdings (Duchin et al., 2017; Darmouni and Mota, 2020). On the one hand, mobility restrictions and trade controls would adversely affect the operating activities and increase the firms' liquidity demand. The precautionary motive hypothesis thus predicts that firms with higher pandemic exposure are likely to hold more financial assets to build precautionary liquidity buffers and enhance liquidity management. On the other hand, the drawdowns of financial incomes caused by pessimistic expectations and heightened uncertainty in financial markets would make investments in financial assets less magnetic (Ashraf, 2020; Goodell and Huynh, 2020; Gormsen and Koijen, 2020; Hu et al., 2021). The return-chasing rationale conversely predicts that pandemic-affected firms significantly reduce their financial asset

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holdings.

Therefore, motivated by the two controversial arguments above, this paper aims to empirically investigate whether and how the COVID-19 pandemic affects the firm's allocation strategy between real and financial assets. With a sample of Chinese A-share listed non-financial firms from 2020 Q1 to 2021 Q3, our baseline regression documents that corporate financial asset holdings shrink a lot under higher regional pandemic exposure, measured as the number of newly confirmed COVID-19 cases per capita in the firm's headquartered province (Ding et al., 2021; Javadi and Masum, 2021). In terms of economic significance, on average, one newly confirmed COVID-19 case in 10,000 people in a quarter will result in an approximately 18% reduction in corporate financial asset holdings. Our results support the return-chasing rationale rather than the precautionary motive. Consistent with the return-chasing predictions, the decline in financial asset holdings is more pronounced among firms with stronger return-chasing incentives or lower return-chasing flexibility. Further analyses show that firms prefer to liquidate highly liquid financial assets to fill the liquidity shortage during the challenging pandemic periods. Our findings are robust to endogeneity issues, alternative measures of the main variables of interest, the inclusion of additional fixed effects, and subsample analyses.

This paper focuses on the pandemic effect on financial asset holdings in China for two primary reasons. Firstly, the widespread financialization in the Chinese financial system provides the opportunity for a comprehensive understanding of corporate financial asset holdings. Chinese corporations invest in financial assets actively (Acharya et al., 2019; Allen et al., 2019; Zhang and Zheng, 2020a, 2020b; Huang et al., 2021). The Chinese formal financial system, which is insufficient to serve the corporate external financing needs (Du et al., 2017), might distinguish the primary motive for Chinese firms to hold financial assets from the situation in the well-developed countries with fully-fledged financial markets (Duchin et al., 2017). This could lead to more potential triggers of corporate financial asset holdings, which might benefit the incremental understanding of financialization. Secondly, the strict risk-level-based pandemic control management and regional mobility restrictions in China imply that the pandemic outbreak greatly shapes local firms' exposure to pandemic-induced uncertainty, providing substantial heterogeneity on the pandemic effect across regions. Hence, the pandemic, inducing the unprecedented and exogenous shocks that deteriorate the corporate financing conditions, provides a unique setting for exploring the mechanisms through which corporate financial asset holdings respond to COVID-19.

Our study mainly contributes to three strands of literature. First, our paper contributes to the burgeoning literature on the economic consequences of the COVID-19 pandemic from the perspective of corporate decisions. With the surging uncertainty in financial markets (Augustin et al., 2021; Duan et al., 2021) and increasing risk in corporate liquidity (De Vito and Gomez, 2020), the pandemic has raised a series of new concerns about how firms strategically navigate the turbulent waters (Hitt et al., 2021). While prior literature has documented the firm-level responses to defend against the "dash for cash", such as the adjustment of cash holdings (Qin et al., 2020), credit lines (Acharya and Steffen, 2020), dividend policy (Cejnek et al., 2021), and investments (Buchheim et al., 2022), little attention has been devoted to the response in financial asset holdings. This paper supplements the pandemic effect on corporate portfolio choices between real and financial assets, which helps understand the corporate behaviors as unforeseen contingencies arise.

Second, this paper contributes to the broad literature on the financialization of non-financial corporations. The widespread phenomenon of financialization has generated a surge of academic research on its driving forces. In line with the board discussions on the precautionary motive (Duchin et al., 2017) and return-chasing rationales (Demir, 2009; Zhang and Zheng, 2020b) of financialization in previous literature, we empirically distinguish the precautionary and return-chasing motives, utilizing the COVID-19 pandemic as the exogenous shock. Our findings support the return-chasing motive, and document that the financial asset is different, at least partially, from the conventional definition of cash reserves (Opler et al., 1999). Moreover, while the pattern of corporate financial asset holdings under regular times has been well-documented, our empirical evidence fills the gap about how the crises and extreme economic environment reshape financialization.

Third, this paper offers empirical evidence to the emerging research on corporate resilience regarding liquidity management. Firm resilience, which shapes the ability to transform the operation structures or means for functioning to recover from adverse shocks, is a critical yet under-studied determinant to reframe what we think about firm performance and survival, especially in the present-day COVID-19 pandemic (Van Der Vegt et al., 2015; Levine et al., 2018; Ding et al., 2021; Cheong, 2021). While previous studies document the crucial role of financial flexibility (Fahlenbrach et al., 2021; Barry et al., 2022), technological capacity (Doerr et al., 2021; Comin et al., 2022), corporate culture, and social trust (Levine et al., 2018; Li et al., 2021) in stabilizing the market value or seizing external supports in difficult times (Levine et al., 2018; Li et al., 2021), the resilience of liquidity management is underexplored. We shed light on the role of financial asset holdings in corporate resilience to public crises, and imply that the liquidation of financial assets might be a solution for liquidity shortage during the pandemic.

The remainder of this paper is organized as follows. Section 2 discusses the related literature and develops the main hypotheses. Section 3 demonstrates the research methodology and empirical design. Section 4 presents the empirical results. We provide a summary and conclusions in Section 5.

2. Literature review and hypothesis development

The COVID-19 pandemic unprecedentedly spread at the beginning of 2020 and continues, causing dramatic disruptions to the economic system and enterprise operating activities. The pandemic adversely affects the cash flows on both the demand and supply sides for most firms, thus potentially plunging a vast majority of firms into an impending liquidity crisis (Acharya and Steffen, 2020; Hassan et al., 2020; Li et al., 2021; Hu and Zhang, 2021). Meanwhile, the pandemic has devastating impacts on financial markets, including an increase in return volatility, market crash risk, and information inefficiency (Ashraf, 2020; Gao et al., 2021; Ozkan, 2021). The extreme uncertainty in financial markets makes corporate financing tougher (Goodell, 2020; Berger et al., 2021; Gao et al., 2022). Firms tend to delay in real investment in the face of aggravated economic uncertainty based on the real option theory (Julio and Yook,

2012; Gulen and Ion, 2015; Baker et al., 2020). Hence, the COVID-19 exacerbates crash risk and the expected dispersion of returns in stock and bond markets, which may adversely affect financial investment.

As COVID-19 harms corporate operations and increases corporate liquidity risk (De Vito and Gomez, 2020), it is of great importance to explore the role of liquidity management, especially the financial assets during the pandemic. Our study also relates to the growing literature on the financialization of non-financial corporations. The dramatic increase of corporate financial asset holdings in advanced and developing economies has opened avenues for fruitful study to explain why firms hold financial assets. Recent literature mainly utilizes precautionary motive and return-chasing motive to interpret the pattern of financial asset holdings (Demir, 2009; Duchin et al., 2017; Huang et al., 2021).

In the context of the precautionary motive, firms hold financial assets as liquid assets relative to less-liquid real assets. In this scenario, financial assets are referred to as part of "cash equivalents", which are similar to cash and could satisfy liquidity demand (Keynes, 1936). Most studies find that firms hold relatively more liquid assets to seize investment opportunities (Denis and Sibilkov, 2010; Cunha and Pollet, 2020), deal with the volatility of cash flow (Bates et al., 2009), and mitigate financial frictions (Almeida et al., 2004; Harford et al., 2014; Phan et al., 2017). Firms may also hold financial assets for return-chasing motive, facing a portfolio choice between financial and real assets. Given the limited funds available to firms, there is a substitution effect between real and financial assets for profit maximization (Tobin, 1965; Liu et al., 2019; Tang and Zhang, 2019). Firms might tend to invest in reversible short-term financial investments rather than irreversible long-term fixed investments, depending on the rates of the return gap and relative risk between financial and fixed investments (Demir, 2009; Zhang and Zheng, 2020a, 2020b). Huang et al. (2021) find that economic policy uncertainty has a negative effect on the financial asset holdings, supporting the return-chasing and speculation rationale of financialization.

Since we do not know if the precautionary motive or the return-chasing motive prevails, how corporate financial asset holdings are affected by the pandemic remains an empirical question. The predicted pandemic effect on corporate financial assets vary based on the precautionary motive versus the return-chasing motive. On the one hand, higher precautionary liquidity demand might increase corporate financial asset holdings. With the surge in pandemic-induced uncertainty in operating activities and cash flows, firms may increase financial asset holdings to reserve liquidity as a buffer against adverse shocks. On the other hand, corporate financial asset holdings might be decreased due to the curbed return-chasing motive during the pandemic. With the exacerbated crash risk and return volatility of risky assets, firms prioritize surviving the crisis and are averse to taking risks for return-chasing during the pandemic. Hence, we propose the following competing hypotheses:

Hypothesis 1a. **:** Ceteris paribus, the COVID-19 pandemic exposure could increase corporate financial asset holdings.

Hypothesis 1b. **:** Ceteris paribus, the COVID-19 pandemic exposure could decrease corporate financial asset holdings.

3. Data and methods

3.1. Data and sample

To investigate the pandemic effect on corporate financing asset holdings, we construct a comprehensive data set organized at a firm-quarter panel, starting from 2020 Q1 and ending in 2021 Q3. Since many regions in China have experienced COVID-19 pandemic outbreaks in 2020 and 2021, our sample spans from the pandemic period when many regions in China have experienced COVID-19 pandemic outbreaks in 2020 and 2021, which provides abundant cross-sectional and time-series variations in the exposure to the pandemic. The confirmed COVID-19 cases at the province level have been available since January 2020 in China Stock Market & Accounting Research Database (CSMAR). Regional characteristics and corporate financial information are retrieved from CSMAR and Wind database.

Our sample contains all Chinese A-share non-financial firms, excluding firms in the financial sector, firms in special treatment, firms that have changed the industry and headquartered city in the sample period, firms with a leverage ratio over 100%, and observations with missing data. All of the continuous variables are winsorized at the 1% and 99% level. The final sample includes 23,275 firm-quarter observations from 3602 firms.

3.2. Variable definitions

3.2.1. Measure of corporate financial asset holdings

We measure corporate financial asset holdings based on the quarterly financial reports of listed firms. Since the new accounting standard on financial instruments was implemented in 2017, the recognition and measurements of corporate financial asset holdings among listed firms in China are relatively accurate and comparable over our sample period.

Following Zhang and Zheng (2020a, 2020b) and the asset classifications in China's financial instruments accounting standard released in 2017, the financial assets consist of cash and cash equivalents, trading securities, derivative financial assets, held-to-maturity investments, debt investment, other debt investment, financial assets available for sales, investment real estate, dividend receivables, and interest receivables. We define corporate financial asset holdings (*FAH*) as the sum of the above assets scaled by total assets. Long-term equity investments are excluded from our definition of financial assets, since the part for real investment and the part for financial investment could not be distinguished in quarterly financial reports without details of each long-term equity investment disclosed. Since cash and cash equivalents may be regarded as asset holdings for operations and thus not included in financial assets in some literature (Huang et al., 2021), we also measure corporate financial asset holdings excluding cash and cash

Table 1
Descriptive Statistics.

Variable	N	Mean	Std. Dev.	Median	Min.	Max.
FAH	23275	24.680	14.860	21.020	5.276	55.120
FAH_NC	23275	7.522	8.817	3.690	0.000	28.290
Cash	23275	16.380	10.210	13.800	3.772	40.390
TS	23275	4.027	6.485	0.230	0.000	20.290
HTM	23275	0.017	0.053	0.000	0.000	0.223
EI	23275	1.423	2.123	0.301	0.000	6.700
Estate	23275	0.819	1.610	0.007	0.000	5.978
Confirmed	23275	0.041	0.054	0.015	0.000	0.152
FIR	23275	0.018	0.039	0.007	-0.033	0.149
RIR	23275	0.102	0.105	0.079	-0.060	0.346
Risk_Gap	23275	1.637	2.893	0.396	0.000	11.910
Size	23275	22.300	1.186	22.110	20.490	24.780
TobinQ	23275	1.868	0.916	1.563	0.948	4.179
ROA	23275	0.042	0.044	0.038	-0.040	0.132
Sales_Growth	23275	0.063	0.136	0.035	-0.109	0.466
IDR	23275	0.146	0.133	0.117	0.000	0.419
UCF	21921	0.057	0.057	0.056	-0.058	0.164
Capex	23275	0.043	0.038	0.032	0.001	0.135
NWC	23275	0.271	0.223	0.269	-0.122	0.668

This table presents the descriptive statistics of main variables.

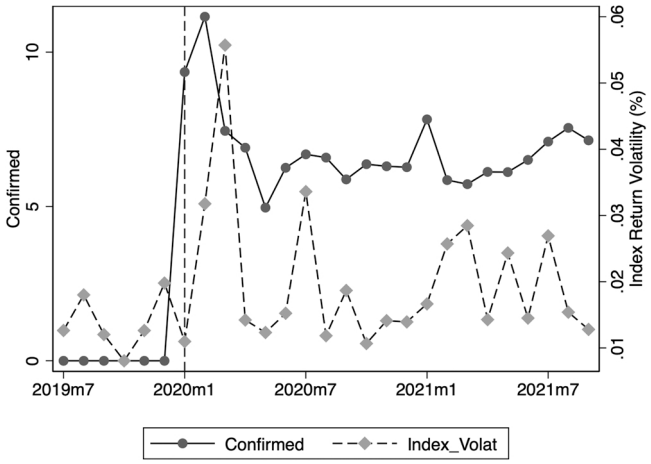

Fig. 1. COVID-19 confirmed cases and return volatility of CSI 300 index in China, Jul. 2019 – Sep. 2021.This figure presents the time series of the logarithm of the nationwide COVID-19 confirmed cases (*Confirmed*) and return volatility of the CSI 300 index (*Index_Volat*) from July 2019 to September 2021. Return volatility is monthly defined as the standard deviation of daily return in a month.

equivalents in robustness tests, which is roughly equivalent to the definition of risky financial assets in the US setting in Duchin et al. (2017). In further analysis, we decompose corporate financial assets based on asset liquidity. The subsample estimation by asset class with different liquidity can also mitigate the concerns on measurement errors associated with the somewhat controversial definitions of financial assets.

3.2.2. Measure of uncertainty induced by regional pandemic exposure

The pandemic outbreak usually shocks local firms owing to mobility restrictions, regional economic deteriorations, and shutdowns. Hence, the newly confirmed COVID-19 cases per capita in the province where a firm locates would be an adequate proxy for its pandemic exposure (Ding et al., 2021), since firms' headquarter locations are usually close to their operations and core business activities (Javadi and Masum, 2021). Since most listed firms have a wide range of operating activities, we mainly use the newly confirmed cases per capita at the province level as the independent variable of interest. We also use the one at the city level in robustness checks.

3.2.3. Other variables

Following Zhang and Zheng (2020a, 2020b), we control a series of characteristics relevant to corporate decisions on financial asset holdings, including the return on financial investment, return on real investment, and their relative risk, since firms often consider the return and risk of financial investment and real investment when deciding on financial asset holdings. Note that the revenue and cost

Table 2
The Pandemic Effect on Corporate Financial Asset Holdings.

	(1) *FAH*	(2) *FAH*	(3) *FAH_NC*	(4) *FAH_NC*
Confirmed	-4.253***	-4.486***	-1.210*	-1.630**
	(0.899)	(0.923)	(0.671)	(0.693)
FIR	-10.583***	-9.608***	0.941	0.971
	(1.938)	(1.975)	(1.292)	(1.336)
RIR	12.014***	13.550***	1.134	1.496
	(1.458)	(1.656)	(0.961)	(1.060)
Risk_Gap	-0.084***	-0.083***	-0.010	-0.010
	(0.019)	(0.019)	(0.012)	(0.012)
Size		2.112***		0.567
		(0.700)		(0.459)
TobinQ		-0.273*		-0.257*
		(0.158)		(0.132)
ROA		-12.457***		-0.866
		(3.801)		(2.461)
Sales_Growth		0.366		-0.705
		(0.590)		(0.464)
IDR		-12.229***		-1.467
		(1.679)		(1.150)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
N	23,275	23,275	23,275	23,275
Adj. R^2	0.90	0.90	0.84	0.84

This table presents the estimation of the pandemic effect on corporate financial asset holdings. FAH denotes corporate financial asset holdings at the end of the quarter. FAH_NC denotes corporate financial asset holdings excluding cash and cash equivalents at the end of the quarter. Confirmed denotes quarterly province-level newly confirmed cases scaled by province-level population. Standard errors clustered by firms are provided in parentheses. * ** , * *, and * represent significance levels of 1%, 5%, and 10%, respectively.

are calculated based on the Trailing Twelve Months (TTM) method to offset the seasonal variation. Variable definitions are presented in **Appendix A**.

3.2.4. Summary statistics and stylized facts

Table 1 tabulates the descriptive statistics of the firm-quarter panel from 2020 Q1 to 2021Q3. *FAH* has a mean of 24.68% and a median of 21.02%, a little larger than the mean of 20.88% in the sample from 2006 to 2016 (Zhang and Zheng, 2020a). *FAH_NC* has a mean of 7.52% and a median of 3.69%, larger than the mean of 2.22% in the sample from 2007 to 2015 (Huang et al., 2021). The difference in the financialization level between our research and the existing studies indicates that Chinese non-financial firms invest more actively in financial assets in these years (Acharya et al., 2019; Allen et al., 2019). Newly confirmed cases per capita vary a lot across different times and provinces of listed firms' headquarters location, with a maximum of 0.152 when there was a series outbreak in Wuhan in February 2020. To alleviate the concern of spurious regression results, we conduct unit root tests on key variables used in our empirical tests in **Appendix B**.

We describe the evolution of the COVID-19 pandemic and the return volatility of the CSI 300 index in Fig. 1. We present the CSI index as a representative financial investment, since other risky financial assets are often strongly correlated with the stock markets and show similar patterns. With the nationwide newly confirmed cases peaking at the beginning of 2020, the stock market volatility soared, which might make it more difficult for firms to pursue high profits in risky financial investments in a volatile environment.

3.3. Model specification

To examine the pandemic effect on corporate financial asset holdings, we exploit model (1) to estimate the relationship between pandemic exposure and corporate financial asset holdings. $Confirmed_{c,t}$ denotes the newly confirmed COVID-19 cases per capita in a quarter at the province level. *Controls* denotes a series of control variables, including return on financial investment (*FIR*), return on real investment (*RIR*), the relative risk of financial investment to real investment (*Risk_Gap*), the logarithm of total assets (*Size*), Tobin's q (*Tobin_Q*), return on assets (*ROA*), sales growth (*Sales_Growth*), and interest-bearing debt ratio (*IDR*) at the previous quarter. Firm fixed effect (δ_i), year and quarter fixed effect (δ_t) are included to control for potential impacts of unobservable firm characteristics or cyclical trading patterns in corporate financial asset holdings or other operating activities. Firms headquartered in regions with more confirmed cases are exposed to greater uncertainty in their local operating activities, generating higher precautionary demand for coping with the adverse local environment. Thus, a significantly positive β would indicate that the precautionary motive dominates. Conversely, a significantly negative β would support the return-chasing rational, since firms may liquidate financial assets held for return-chasing purposes during the pandemic.

$$FAH_{i,c,t} = \alpha + \beta Confirmed_{c,t} + \gamma Controls + \delta_i + \delta_t + \varepsilon_{i,c,t} \quad (1)$$

Table 3
Mechanism Analysis: Return-chasing Incentive.

	(1) *FAH* *Real*	(2) *FAH* *SOE*	(3) *FAH* *Cost*	(4) *FAH* *Institution*
*Confirmed*X*	3.414*	2.854*	-0.503***	3.020*
	(1.781)	(1.529)	(0.020)	(1.554)
Confirmed	-3.259***	-5.367***	-3.784***	-5.970***
	(0.886)	(1.125)	(0.944)	(1.232)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
N	23,275	21,920	22,121	23,422
Adj. R^2	0.90	0.92	0.90	0.90

This table presents the results of examining the return-chasing rational of corporate financial asset holdings. FAH denotes corporate financial asset holdings at the end of the quarter. Confirmed denotes quarterly province-level newly confirmed cases scaled by province-level population. X denotes a dummy of real industries with high profitability or government support, the state-owned enterprise, high administrative cost standardized by revenue, and high institutional ownership in columns (1) – (4) at the end of 2019, respectively. Standard errors clustered by firms are provided in parentheses. * ** , * *, and * represent significance levels of 1%, 5%, and 10%, respectively.

To explore the mechanisms through which the pandemic affects corporate financial asset holdings, we examine how pre-2020 corporate characteristics related to the motives of financial asset holdings affect the pandemic effect on corporate financial asset holdings. We adopt model (2), where X denotes measures of real sector profitability, equity nature, corporate governance, and financial constraints, respectively. The first-order coefficients of pre-2020 characteristics are absorbed in firm fixed effect.

$$FAH_{i,c,t} = \alpha + \beta_1 Confirmed_{c,t} + \beta_2 Confirmed_{c,t} * X + \gamma Controls + \delta_i + \delta_t + \varepsilon_{i,c,t} \quad (2)$$

4. Empirical results

4.1. Baseline results

Table 2 presents the baseline results of model (1). Each regression contains the firm, year, and quarter fixed effect to control the firm-level time-invariant and unobservable factors, the annual macroeconomic trends, and seasonal variations respectively. The regression coefficients of *Confirmed* are significantly negative in columns (1) and (2), indicating that firms shrink their financial asset holdings under higher pandemic exposure. In terms of the economic significance, as shown in column (2), one newly confirmed case in 10,000 people within a quarter, on average, will lead to an approximately 18% (=4.4862/24.680) reduction in financial asset holdings of a listed firm headquartered in the province. The results in columns (3) and (4) indicate that the non-cash financial asset holdings also significantly decrease by local pandemic exposure. The negative effect of the pandemic on financial asset holdings is opposite to the precautionary prediction but preliminarily consistent with **H1b**. Our findings are consistent with Huang et al. (2021), who find that economic policy uncertainty has a negative effect on corporate asset holdings. Firms devest them in the face of extreme uncertainty in the financial markets induced by the pandemic. The results suggest that a large proportion of Chinese firms may not hold financial assets for the precautionary motive.

4.2. Mechanism analysis

This section explores the mechanisms through which the pandemic impedes corporate financial asset holdings by studying how the pandemic effect is heterogeneous based on firms' pre-pandemic characteristics. Firms with high pandemic exposure are more likely to form an expectation of extremely high uncertainty on future returns, and thus become more reluctant to gamble in financial investment to chase high returns. Firms tend to keep safe assets in an adverse operating environment and pay less priority to return-chasing financial assets under tightened liquidity during the crisis. Thus, the resilience to pandemic shocks is expected to be weaker for financial assets held for return-chasing. Thus, if the return-chasing motive dominates *ex-ante*, the negative pandemic effect *ex-post* is expected to be stronger among firms under higher return-chasing incentives or lower return-chasing flexibility.

Firstly, under rational substitution between real and financial assets for profit maximization, the incentive of return-chasing would be impeded by promising real investment (Liu et al., 2019; Tang and Zhang, 2019). Firms in sectors with a higher return on real investment or policy preferential supports at the end of 2019 (*Real*) are more likely to pursue profits in the major business and invest less in financial assets. Secondly, with a long-term orientation and social responsibility, state-owned enterprises (*SOE*) are less likely to invest in financial assets heavily to chase high returns. Thirdly, the return-chasing motive would be exaggerated by agency problems, due to both private benefits of gaining experience in managing multi-asset portfolios and overconfidence in generating high excess returns but only taking on systematic risk of managers (Duchin et al., 2017). We use high administrative cost (*Cost*) and low institutional ownership (*Institution*) in 2019 to proxy for poor internal and external corporate governance.

Table 3 presents the test on the return-chasing incentive of financial asset holdings. The interaction term of *Confirmed*Real* is

Table 4
Mechanism Analysis: Return-chasing Capacity.

	(1) *FAH* *KZ*	(2) *FAH* *Cash*
*Confirmed*X*	-3.073*	8.505***
	(1.570)	(1.567)
Confirmed	-2.556*	-7.731***
	(1.318)	(1.123)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Quarter FE	Yes	Yes
N	20,639	21,355
Adj. R^2	0.90	0.90

This table presents the results of examining the return-chasing rational of corporate financial asset holdings. FAH denotes corporate financial asset holdings at the end of the quarter. Confirmed denotes quarterly province-level newly confirmed cases scaled by province-level population. X denotes a dummy of high KZ index, and high cash ratio (cash/total assets) in columns (1) and (2) at the end of 2019, respectively. Standard errors clustered by firms are provided in parentheses. * ** , * *, and * represent significance levels of 1%, 5%, and 10%, respectively.

Table 5
Pandemic and Corporate Liquidity Demand.

	(1) *ROA*	(2) *Sales*	(3) *Expense*	(4) *OCF*	(5) *Return_Gap*	(6) *Capex*
Confirmed	-0.023***	-0.112***	0.005***	-0.035***	0.007	0.002
	(0.004)	(0.020)	(0.001)	(0.008)	(0.013)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
N	23,275	23,275	23,275	23,275	23,275	23,275
Adj. R^2	0.63	0.95	0.92	0.64	0.73	0.82

This table presents the results of examining the pandemic effects on ROA, sales to total assets (Sales), administrative expense (Expense), operating cash flow to total assets (OCF), return gap of real investment to financial investment (Return_Gap), and capital expenditure to total assets (Capex). The explanatory variables are Confirmed lagged by a quarter in columns (1) and (2), and Confirmed in the concurrent quarter in columns (3) – (6). Standard errors clustered by firms are provided in parentheses. * ** , * *, and * represent significance levels of 1%, 5%, and 10%, respectively.

significantly positive, which indicates that firms with a higher return on real investment or policy preferential supports before the pandemic are less affected since these firms give less weight to the financial assets. The interaction term of *Confirmed*SOE* is significantly positive, implying that the adverse effect of COVID-19 on financial assets is weaker for SOEs with soft budget constraints (Lin and Tan, 1999). The negative coefficient of *Confirmed*Cost* and the positive coefficient of *Confirmed*Institution* indicate that firms with return-chasing incentives enhanced by severer agency conflicts experience a more pronounced decline in financial assets. The results indicate that the financial asset holdings of firms with solid major business or sound corporate governance in the pre-pandemic periods are less likely attributed to return-chasing motive. Thus, with the return-chasing motive depressed by the exacerbated uncertainty in financial investments reducing the attractiveness of the financial assets, firms tend to reduce financial asset holdings.

Firms' accessibility to external financing may affect their financial asset holdings in an uncertain environment (Favara et al., 2021). During the pandemic, firms prioritize survival from the pandemic periods rather than return-chasing. Suffering lower return-chasing flexibility due to insufficient funds in difficult and uncertain times, financially constrained firms are expected to hold less financial assets. Thus, the financial assets held for return-chasing purpose is expected to drop by the pandemic exposure at a greater magnitude among firms with worse return-chasing capacity. We exploit the KZ index at the end of 2019 to proxy for firms' pre-pandemic financial constraints (Kaplan and Zingales, 1997), and adopt the cash ratio at the end of 2019 to negatively measure financial constraints.

Table 4 shows that the negative effect of pandemic exposure on local firms' financial asset holdings is more substantial among firms with higher financial constraints. With deteriorated return-chasing capacity during the pandemic, firms tend to reduce financial assets held for return-chasing purposes. Besides, firms with higher financial constraints have stronger precautionary demand. The result also strongly rejects the precautionary motive hypothesis, for it contradicts the precautionary prediction that higher precautionary demand under greater uncertainty induced by the pandemic leads to higher precautionary financial asset holdings. Overall, the results reveal that the weakened return-chasing motive during the pandemic is the underlying mechanism of the negative pandemic effect on financial asset holdings.

Table 6
The Pandemic Effect on Different Types of Corporate Financial Assets.

	(1) *Cash*	(2) *TS*	(3) *HTM*	(4) *EI*	(5) *Estate*
Asset Liquidity	*High*				*Low*
Confirmed	-3.072***	-1.494***	-0.004	-0.078	0.149*
	(0.870)	(0.575)	(0.005)	(0.124)	(0.077)
FIR	-11.076***	-2.168**	0.010	0.923***	0.059
	(1.493)	(0.968)	(0.011)	(0.337)	(0.178)
RIR	11.595***	1.004	-0.000	0.272	0.198
	(1.316)	(0.818)	(0.008)	(0.193)	(0.175)
Risk_Gap	-0.070***	-0.013	0.000	-0.000	-0.001
	(0.015)	(0.009)	(0.000)	(0.003)	(0.002)
Size	1.297**	1.375***	0.000	-0.189**	-0.318***
	(0.562)	(0.376)	(0.003)	(0.092)	(0.053)
TobinQ	0.111	-0.255**	-0.000	0.055***	-0.007
	(0.146)	(0.112)	(0.001)	(0.021)	(0.012)
ROA	-6.925**	-0.766	0.028	0.596	-0.273
	(3.012)	(1.855)	(0.018)	(0.425)	(0.351)
Sales_Growth	0.634	-0.367	-0.004	-0.400***	-0.038
	(0.510)	(0.378)	(0.003)	(0.073)	(0.043)
IDR	-9.900***	-2.554***	0.005	0.701***	0.421***
	(1.390)	(0.907)	(0.009)	(0.240)	(0.135)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Quarter	Yes	Yes	Yes	Yes	Yes
N	23,275	23,275	23,275	23,275	23,275
Adj. R^2	0.81	0.80	0.72	0.95	0.92

This table presents the estimation of the pandemic effect on five types of corporate financial assets. Cash denotes cash and cash equivalents. TS denotes trading securities and derivative financial assets. HTM denotes held-to-maturity investments, debt investment, other debt investment, and interest receivables. EI denotes other equity investment, other non-current financial assets, and dividend receivables. Estate denotes investment real estate. Both explained variables are scaled by total assets at the end of the quarter. Confirmed denotes quarterly province-level newly confirmed cases scaled by province-level population. Standard errors clustered by firms are provided in parentheses. * ** , * *, and * represent significance levels of 1%, 5%, and 10%, respectively.

4.3. Further analysis

Firms make asset allocation decisions under intensified liquidity demand during the pandemic. We investigate whether and how the sources and consumption of assets liquidity would be influenced by pandemic exposure of firms' locations. As Table 5 shows, the pandemic exposure negatively impacts firms' overall performance measured by ROA. As the pandemic exposure increases, firms' sales revenue drops, and administrative expense increases. The significant reduction of net operating cash flow is consistent with the above results of shrunken inflows and higher costs of maintaining operating activities. Due to different responsiveness to the pandemic, we regress ROA and sales on lagged confirmed cases, and regress administrative expense and operating cash flow on concurrent confirmed cases. However, the pandemic exposure has no significant impact on the relative return measured by the difference of return on real investment and financial investment (*Return_Gap*), as well as the scale of real investment proxied by capital expenditure (*Capex*). That is, the reduction in financial assets does not significantly translate into long-term investments. It is likely that the reduction in financial asset holdings is one of firms' asset allocation strategies and portfolio choices for liquidity management during the pandemic, rather than asset substitution between financial and real investment, which is a popular explanation for non-crisis periods without extreme uncertainty (Tobin, 1965; Liu et al., 2019; Tang and Zhang, 2019).

To further investigate how firms adjust their financial assets to respond to the pandemic, we differentiate the effects of the pandemic on corporate financial asset holdings categorized by financial assets' liquidity. The pandemic-induced uncertainty increases the liquidity demand (Berger et al., 2022). Cash significantly dropped by the pandemic exposure, implying a potential liquidity demand for assets reallocation. Among other types of financial assets, trading securities are the most liquid, followed by held-to-maturity investments, while other equity instruments and investment real estate have the most attributes of value preservation. As presented in Table 6, the effect of confirmed cases is significantly negative to cash and cash equivalents (*Cash*) and trading securities (*TS*), while slightly positive to investment real estate (*Estate*). The decrease in financial asset holdings is mainly driven by the reduction of most liquid financial assets. For liquidity management during the pandemic period, firms prefer to sell off most liquid financial assets like trading securities for their transaction cost would be lower.

4.4. Robustness

There are potential endogeneity concerns that the pandemic outbreaks may not be randomly assigned among different regions. The negative relation between newly confirmed cases and local firms' financial asset holdings might be driven by some unobservable characteristics. We utilize the instrumental variable (IV) approach to address this endogeneity issue and strengthen the causality of the

Table 7
The Pandemic Effect on Corporate Financial Asset Holdings – 2SLS regressions.

	(1) *Confirmed*	(2) *FAH*	(3) *FAH_NC*	(4) *Confirmed*	(5) *FAH*	(6) *FAH_NC*
Confirm_Neighbor	0.058 ***					
	(0.007)					
Passenger_Traffic				0.042 ***		
				(0.002)		
Confirmed (predicted)		-7.359 **	-3.748 *		-9.336 *	-6.049 *
		(3.014)	(1.919)		(4.771)	(3.545)
Controls	–	Yes	Yes	–	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
N	23,275	23,275	23,275	23,275	23,275	23,275
F	442.42			638.06		

This table presents the 2SLS estimation results of the pandemic effect on corporate financial asset holdings. The dependent variable for the first stage regression in columns (1) and (3) is Confirmed. The dependent variable for the second stage is corporate financial asset holdings (FAH) in columns (2) and (5), and corporate financial asset holdings excluding cash and cash equivalents (FAH_NC) in columns (3) and (6). Columns (1) – (3) utilize the average confirmed cases scaled by the population of all bordering provinces of each particular province as the instrument variable. Columns (4) – (6) utilize the passenger traffic scaled by population lagged by two quarters as the instrument variable. Standard errors clustered by firms are provided in parentheses. * ** , * *, and * represent significance levels of 1%, 5%, and 10%, respectively. Cragg-Donald Wald F-statistic of the relation between Confirmed and the instrument variable is reported in the last row.

pandemic effect on corporate financial asset holdings. The first IV we use is the average newly confirmed cases per capita of all bordering provinces of the particular province. Intuitively, the pandemic outbreaks have a spillover effect in geographically proximity due to the human-to-human transmission of the virus, while firms are usually not directly affected by the pandemic outbreaks in neighboring zones. We adopt the province-level passenger transportation scaled by population lagged by two quarters as the second IV. Also, due to the human-to-human virus transformation, the pandemic outbreaks in a province are positively correlated with the passenger traffic and frequent human mobility. However, they are not directly associated with corporate financial asset holdings. Thus, the two IVs are relevant and satisfy the exclusive restriction.

The 2SLS estimation results of the IV approach are reported in Table 7. The significant correlation between IV and the pandemic exposure shown in the first-stage estimation results and the F-statistics confirm the validity of IV. The second-stage estimation results indicate that the pandemic exposure significantly reduces corporate financial asset holdings, consistent with the baseline results.

We conduct several robustness checks based on different model specifications and samples. First, we consider more supply and demand shocks to corporate financial asset holdings. Following Duchin et al. (2017), we control the unexpected cash flows (*UCF*), capital expenditure (*Capex*), and net working capital (*NWC*) to capture the impacts of cash inflows and outflows on financial asset holdings. Second, to control confounding effects of changes in regional economic fundamental changes, we first add provincial GDP to control regional macroeconomics, and add city-year and industry-year fixed effects to control for time-and-city-varying and time-and-industry-varying fundamental changes. Third, we use city-level quarterly newly confirmed cases as an alternative proxy for firms' uncertainty exposure. Last, we use the subsample on the main board of Shanghai Stock Exchange and Shenzhen Stock Exchange, and also extend the sample period from 2018 Q1 to 2021 Q3 to alleviate the concerns of accidental factors.

Table 8 reports the robustness checks. In columns (1) and (2), the adverse effect of the pandemic outbreaks on corporate financial asset holdings holds after controlling the cash flow shocks. Besides, the positive effect of *UCF* and *NWC*, and the negative effect of *Capex* on corporate financial asset holdings, are consistent with the findings in previous studies. The results are also robust after controlling local GDP and adding city-year and industry-year fixed effects in columns (3) – (6). Columns (7) and (8) present the results adopting city-level newly confirmed cases as the alternative independent variable. The negative relation between newly confirmed cases and corporate financial asset holdings still significantly exists in the subsample of firms listed on the main board, and the sample covering from 2018 Q1 to 2021 Q3. Overall, the pandemic effect on corporate financial asset holdings is robust to endogeneity concerns regarding nonrandom pandemic outbreaks, omitted variables, and measurement errors.

5. Conclusion

We investigate the pandemic effect on financial asset holdings of non-financial firms. We find that corporate financial asset holdings significantly decrease among firms headquartered in pandemic-affected zones. Mechanism analyses show that firms with higher return-chasing incentives or lower return-chasing flexibility are more negatively affected by the pandemic, supporting the return-chasing rationale rather than the precautionary rationale. In addition, firms prefer to reduce highly liquid financial assets to cope with liquidity shortages for survival in the challenging pandemic periods. Our conclusions remain robust in addressing endogeneity concerns, including IV estimation, alternative variable definitions, and the use of the main board subsample.

There are several implications in our study. Besides direct disruptions on operating activities and trading behaviors in financial assets, this paper reveals the indirect economic consequences of the COVID-19 pandemic on corporate response concerning corporate portfolio choice. With heightened uncertainty in financial markets and a complicated economic environment during the COVID-19

Table 8
Robustness Checks.

	(1) *FAH*	(2) *FAH_NC*	(3) *FAH*	(4) *FAH_NC*	(5) *FAH*	(6) *FAH_NC*	(7) *FAH*	(8) *FAH_NC*	(9) *FAH*	(10) *FAH*
Confirmed	-2.594 ***	-1.239 *	-1.937 **	-1.266 *	-5.019 ***	-1.425 **			-4.018***	-3.226**
	(0.834)	(0.666)	(0.948)	(0.759)	(0.801)	(0.624)			(1.041)	(1.303)
Confirmed_City							-2.130 ***	-1.217**		
							(0.657)	(0.507)		
FIR	-5.270 ***	2.014	-5.263 ***	2.014	-10.157 ***	0.930	-9.622 ***	0.975	-6.891***	-32.176***
	(1.848)	(1.316)	(1.848)	(1.316)	(1.933)	(1.299)	(1.976)	(1.337)	(2.256)	(2.336)
RIR	10.081 ***	1.419	10.090 ***	1.419	13.300 ***	1.322	13.548 ***	1.495	16.576***	11.146***
	(1.585)	(1.037)	(1.585)	(1.037)	(1.623)	(1.073)	(1.656)	(1.060)	(2.292)	(1.546)
Risk_Gap	-0.064 ***	-0.012	-0.064 ***	-0.012	-0.083 ***	-0.014	-0.081 ***	-0.010	-0.077***	-0.127***
	(0.018)	(0.012)	(0.018)	(0.012)	(0.019)	(0.012)	(0.019)	(0.012)	(0.020)	(0.019)
Size	4.529 ***	1.237 ***	4.528 ***	1.237 ***	2.569 ***	0.900 *	2.105 ***	0.573	1.598*	1.119**
	(0.632)	(0.453)	(0.631)	(0.453)	(0.720)	(0.475)	(0.701)	(0.460)	(0.856)	(0.554)
TobinQ	-0.326 **	-0.338 ***	-0.326 **	-0.338 ***	-0.311 **	-0.196	-0.265*	-0.257*	-0.061	0.357**
	(0.131)	(0.127)	(0.131)	(0.127)	(0.156)	(0.128)	(0.158)	(0.132)	(0.199)	(0.155)
ROA	-12.811 ***	-1.134	-12.847 ***	-1.133	-13.565 ***	-1.752	-12.459 ***	-0.870	-8.246*	2.974
	(3.532)	(2.435)	(3.532)	(2.435)	(3.800)	(2.508)	(3.803)	(2.460)	(4.653)	(3.490)
Sales_Growth	-1.948 ***	-1.753 ***	-1.989 ***	-1.751 ***	0.390	-0.711	0.487	-0.704	-1.170	-1.662***
	(0.548)	(0.397)	(0.549)	(0.399)	(0.585)	(0.460)	(0.588)	(0.464)	(0.713)	(0.559)
IDR	5.804 ***	0.886	5.782 ***	0.887	-12.908 ***	-1.729	-12.206***	-1.477	-10.348***	-10.435***
	(1.527)	(1.206)	(1.526)	(1.206)	(1.654)	(1.134)	(1.679)	(1.150)	(1.970)	(1.594)
UCF	22.248 ***	6.365 ***	22.220 ***	6.366 ***						
	(1.362)	(1.060)	(1.362)	(1.059)						
Capex	-28.635 ***	-10.484 ***	-28.583 ***	-10.486 ***						
	(3.376)	(2.655)	(3.377)	(2.656)						
NWC	27.932 ***	3.597 ***	27.937 ***	3.597 ***						
	(1.192)	(0.818)	(1.192)	(0.819)						
GDP			1.503 *	-0.062						
			(0.846)	(0.750)						
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City-Year FE	No	No	No	No	Yes	Yes	No	No	No	No
Industry-Year FE	No	No	No	No	Yes	Yes	No	No	No	No
N	21,920	21,920	21,920	21,920	23,268	23,268	23,275	23,275	16,736	43,323
Adj. R^2	0.92	0.85	0.92	0.85	0.91	0.85	0.90	0.84	0.90	0.80

This table presents the robustness checks of the pandemic effect on corporate financial asset holdings. Columns (1) – (8) present the full sample results. Column (9) presents the result using the subsample of firms listed on the main board. Column (10) presents the full sample result with sample periods from 2018 Q1 to 2021 Q3. FAH denotes corporate financial asset holdings at the end of the quarter. FAH_NC denotes corporate financial asset holdings excluding cash and cash equivalents at the end of the quarter. Confirmed denotes quarterly province-level newly confirmed cases scaled by province-level population. Confirmed_City denotes quarterly city-level newly confirmed cases scaled by city-level population. Standard errors clustered by firms are provided in parentheses. * ** , * *, and * represent significance levels of 1%, 5%, and 10%, respectively.

pandemic, firms need to focus on improving the main business and adopt appropriate precautionary liquidity management to enhance overall competitiveness in the long run. Firms may take good advantage of financial assets holdings and flexibly reallocate asset portfolios to strengthen resilience to adverse shocks during the pandemic and post-pandemic periods.

This study furthers the understanding of the development of financial markets and unique institutional settings in China (Allen et al., 2005, 2019). Different from well-developed countries with fully-fledged financial markets where corporate financial asset holdings are mainly driven for precautionary needs (Duchin et al., 2017), our findings reveal that financial asset holdings are predominantly return-chasing in emerging markets, which would be an alarming issue of the long-term damage to real economy development. This paper delivers extra insights into the role of financial assets in a transitioning economy and may motivate studies in countries with various constitutional structures and legal systems in the US or European.

Data Availability

Data will be made available on request.

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Appendix. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ribaf.2022.101750.

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