Margin purchases, short sales and stock return volatility in China: Evidence from the COVID-19 outbreak

Yongjia Lin [a], Yizhi Wang [b,*], Xiaoqing (Maggie) Fu [c]

[a] *School of Business, Macau University of Science and Technology, Macau, China*
[b] *School of Finance, Shandong University of Finance and Economics, Shandong, China*
[c] *Faculty of Business Administration, University of Macau, Macau, China*

A R T I C L E   I N F O

A B S T R A C T

In this paper, we investigate the effects of margin purchases and short sales on the return volatility in the Chinese stock market during the COVID-19 outbreak. We present two main findings. First, we show that stocks with higher level of margin-trading activity exhibit higher return volatility. The COVID-19 outbreak amplifies the destabilizing effects of margin-trading activity. Second, no evidence shows that short selling destabilizes the stock market in general. However, we observe that intensified short-selling activity is associated with lower return volatility when infection risk is high during the COVID-19 crisis.

1. Introduction

China launched the margin-trading and short-selling reform at the end of March 2010.[1] Although the purpose of this regulatory change is to integrate more information into share prices, the effects of margin purchases and short sales on the stock return volatility are highly controversial. On the one hand, Curtis and Fargher (2014), among others, suggest that both margin traders and short sellers are informative investors. Share prices may approach the intrinsic value as more information incorporated into share prices by margin trading and short selling. As a result, the stock return volatility declines with the margin-trading and short-selling activities.[2] On the other hand, some scholars and regulators argue that margin traders are speculators, whereas short sellers reveal private information that affects share prices, and their activities increase return volatility and destabilize the stock markets (e.g., Chowdhry and Nanda, 1998; Henry and McKenzie, 2006; and Chang et al. 2007).[3] However, Seguin (1990) finds no higher volatility or an improved liquidity after the margin trading is allowed for the U.S. OTC stocks. He suggests that margin-trading restrictions are not an effective tool to control return volatility. Diether et al. (2009) and Saffi and Sigurdsson (2011) also show that short selling is not significantly associated with higher stock return volatility.

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* Corresponding author.
  E-mail addresses: yjlin@must.edu.mo (Y. Lin), yizhi.wang@sdufe.edu.cn (Y. Wang), maggiefu@um.edu.mo (X.(M. Fu).
[1] Source: http://english.sse.com.cn/news/newsrelease/c/4947105.shtml.
[2] Also see Dechow et al. (2001); Asquith et al. (2005); Engelberg et al. (2012); Chang et al. (2014).
[3] Chowdhry and Nanda (1998) propose a model to show that the rigidity of the margin requirement creates market instability, which is understood as a multiplicity of market-clearing prices. Henry and McKenzie (2006) find that the Hong Kong stock market displays higher volatility after a period of short selling, and they conjecture that the volatility asymmetry is exacerbated by short selling.

In this paper, we empirically investigate the effects of margin trading and short selling on the stock return volatility in the Chinese stock market during the COVID-19 outbreak. Considering no other disease has dragged down the world's economy and led to uncertainty on the financial markets as the COVID-19 outbreak, a handful of studies have examined the financial markets' volatility in this pandemic (e.g., see Baker et al. 2020; Baek et al. 2020; Zaremba et al. 2020; Albulescu, 2021). But little evidence is provided to show the roles of margin traders and short sellers in the return volatility at the stock level during the COVID-19 outbreak. To fill this gap, we posit that the COVID-19 outbreak is an exogenous shock and analyse whether the margin purchases and short sales have any effects on the stock return volatility in the Chinese stock market during the COVID-19 outbreak.

Three observations can be summarized from the empirical results. First, we focus on the stock return volatility for the eligible stocks of the margin-trading and short-selling pilot program. Our evidence shows that stocks with higher margin-trading turnover exhibit higher stock return volatility, whereas short-selling turnover is not significantly associated with the change in the return volatility. The evidence strongly supports the conjecture that margin traders produce excess volatility whereas short sellers do not destabilize the Chinese stock market.

Second, we utilize panel data on margin purchases and short sales at the stock level to examine the impacts of these activities on the price fluctuations during the COVID-19 outbreak. Since the COVID-19 pandemic has triggered a massive spike in uncertainty, and margin traders are more likely to increase speculative trading when the market uncertainty is high.[4] We hypothesize that margin trading during the periods with high market uncertainty destabilizes the stock prices by producing excess volatility.[5] Consistent with our expectation, we observe that stocks with higher margin-trading turnover have significantly higher stock return volatility than those with low margin-trading turnover during the COVID-19 outbreak. In contrast, we find no evidence that short selling destabilizes the Chinese stock market during the COVID-19 outbreak.

Third, we further use infection risk, measured by the number of daily confirmed COVID-19 cases, to reflect the severity of outbreak and investigate whether the effects of margin purchases and short sales on the return volatility are affected by the severity of the COVID-19 outbreak. Our empirical evidence also suggests that, when the infection risk is high, stocks with higher margin-trading turnover exhibit higher stock return volatility than those with low margin-trading turnover. However, we show that the stocks with higher short-selling turnover tend to have lower return volatility than those with low short-selling turnover when the infection risk is high. This finding indicates that short sellers bring informational efficiency to market prices rather than destabilizing them when the market uncertainty soars. One possible reason is that during periods with higher market uncertainty, the heterogenous beliefs among investors lead to higher stock return volatility (Shalen, 1993). Short sellers are skilled at identifying and correcting mispriced securities by processing their superior information (Dechow et al., 2001; Asquith et al., 2005). Stocks with higher level of short-selling activity are relatively less likely to have prices that are further deviated from their intrinsic values. Consequently, their prices tend to be more stable.

Our paper contributes to the existing literature from two different perspectives. First, we contribute to the emerging literature investigating the impact of the COVID-19 outbreak on the financial market. Our findings provide important implications for regulators to formulate trading rules to address market uncertainty. Second, out paper contributes to the literature examining the effects of margin traders and short sellers on the stock market. Our study suggests that margin trading and short selling have different effects on the return volatility in the Chinese stock market.

The reminder of this paper is organized as follows. In Section 2, we introduce the data and methodology. In Section 3, we present the empirical results. In Section 4, we conclude the study.

2. Data and methodology

2.1. Data

Our sample contains all non-financial A-share stocks that are eligible for margin-trading and short-selling activities in the Chinese stock market from August 19, 2019 to August 18, 2020. We choose to start our analysis from August 19, 2019 as it is the date for the latest adjustment of the margin-trading and short-selling eligible list in the Chinese stock market. We collect market information, number of daily confirmed COVID-19 cases, and margin-trading and short-selling data from the China Stock Market & Accounting Research (CSMAR) database.

2.2. Measuring margin purchases, short sales, and stock return volatility innovation

To capture the margin-purchase activity, we follow Chang et al. (2014) to calculate the margin-trading turnover ($MTT_{i,t}$) as the daily margin-trading volume in shares scaled by the daily trading volume in shares for each stock i on each trading day t. Similarly, the short-selling turnover ($SST_{i,t}$) is defined as the daily short-selling volume in shares scaled by the daily trading volume in shares.

Stock return volatility is generally associated with investment risks. Because stock return volatility is highly persistent, we focus on

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[4] Margin traders are often blamed as potentially informative speculators (Chang et al., 2014), and Friedman (1953) conjectures that speculative trades destabilize stock market when speculators are irrational.

[5] Scholars suggest that intensive speculative trading can produce excess volatility and destabilize the market (e.g., Hardouvelis and Peristiani, 1992; Stein and Hong, 1990; DeLong et al., 1990; Hart and Kreps, 1986).

the effects of margin trading and short selling on the stock return volatility innovations.[6] Specifically, we calculate the stock return volatility innovation ($VI_{i,t}$) as the difference between the observed stock return volatility and the prediction of return volatility. The observed stock return volatility is measured by the standard deviation of the daily stock returns over one week, and the prediction of return volatility refers to the historical average of the stock return volatility over the past 180 days (Dimson and Marsh, 1990; Yu, 2002).

2.3. Empirical design

In this paper, we examine the effects of margin-trading and short-selling activities on the stock return volatility innovations through three sets of panel regressions. One important concern relates to endogeneity. For instance, short sellers may form their positions based on the current stock return volatility, which will affect the future stock return volatility.[7] To address the potential endogenous problems which may arise from reverse causality and the confounding effects of unobserved variables (Wooldridge, 2015), we follow Saffi and Sigurdsson (2011) and use a two-stage least squares (2SLS) estimation.[8] This approach relies on the notion that our instrumental variables are related to endogenous variables but are uncorrelated with the error terms (Larcker and Rusticus, 2010; Roberts and Whited, 2013). Specifically, our instrumental variables are related to margin-trading and short-selling activities, and these instruments are correlated with stock return volatility only through their correlations with margin-trading and short-selling activities. Following Dhaliwal et al. (2016) and Liu et al. (2021), we use the average industry endogenous variables as our instrumental variables, such as the daily average industry margin-trading and short-selling turnovers.[9]

In our first regression as below, we focus on the general effects of margin trading and short selling on the stock return volatility for the eligible stocks,

$$VI_{i,t} = \beta_0 + \beta_1 MTT_{i,t}\left(SST_{i,t}\right) + \beta_2 Controls_{i,t} + \varepsilon_{i,t},$$

where $VI_{i,t}$ is the stock return volatility innovation, $MTT_{i,t}$ is the margin-trading turnover and $SST_{i,t}$ is the short-selling turnover. The control variables include share turnover and the logarithm of market capitalization. We also include firm and month fixed effects to control for any other unobservable effects.

In the second analysis, we examine the impacts of margin trading and short selling on the stock return volatility innovations during the COVID-19 outbreak. Specifically, we conduct the following regression:

$$VI_{i,t} = \beta_0 + \beta_1 MTT_{i,t}\left(SST_{i,t}\right) + \beta_2 MTT_{i,t}\left(SST_{i,t}\right) * During_t + \beta_3 During_t + \beta_4 Controls_{i,t} + \varepsilon_{i,t},$$

where $During_t$ is a dummy variable that indicates the COVID-19 outbreak period, which equals to one from January 11, 2020 to April 29, 2020, and zero otherwise. We take January 11, 2020 as the starting point of the COVID-19 outbreak period since it is the date that the National Health Commission of the People's Republic of China firstly reported the data about COVID-19 crisis. We choose April 29, 2020 as the ending point of the COVID-19 outbreak period as it is the date on which Jinping Xi announced that China had won a vital battle against the COVID-19 pandemic.[10]

We further investigate whether the effects of margin purchases and short sales on the stock return volatility innovations are affected by the severity of the COVID-19 in the following regression:

$$VI_{i,t} = \beta_0 + \beta_1 MTT_{i,t}\left(SST_{i,t}\right) + \beta_2 MTT_{i,t}\left(SST_{i,t}\right) * IR_t + \beta_3 IR_t + \beta_4 Controls_{i,t} + \varepsilon_{i,t},$$

where IR_t is the COVID-19 infection risk, which is measured by the number of daily confirmed COVID-19 cases. A higher number of daily confirmed COVID-19 cases implies a higher infection risk of COVID-19.

We also create two dummy variables $D_{HighMTT,i,t}$ and $D_{HighSST,i,t}$, and facilitate similar tests to examine the impacts of margin-trading and short-selling activities on the stock return volatility innovations during the COVID-19 Outbreak. $D_{HighMTT,i,t}$ is a dummy variable that equals to one for firm i if its margin-trading turnover is ranked among the top quintile for each trading day t. $D_{HighSST,i,t}$ is a dummy variable that equals to one for firm i if its short-selling turnover is ranked among the top quintile for each trading day t.

3. Empirical results

3.1. Baseline results

Table 1 shows the summary statistics of our sample. In Panel A, we report the descriptive statistics for the entire sample period. We

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[6] We thank the editor and the anonymous reviewer for the suggestion to apply the volatility innovation to the empirical analysis.

[7] We thank the anonymous reviewer for pointing out the potential endogenous problems.

[8] The first-stage results that regress each particular margin-trading and short-selling measures on the selected instrumental variables and the set of control variables used in Table 2 are available upon request.

[9] They would meet the relevant condition because it is highly related to a firm's margin-trading and short-selling activities, while average industry margin-trading and short-selling activities are unlikely correlated with the firm's stock return volatility after controlling for firm effect.

[10] Xi Jinping chaired a meeting of the Standing Committee of the Political Bureau of the CPC Central Committee on April 29, 2020. He concluded that China had achieved a major strategic success in the nationwide control efforts for the COVID-19 pandemic.

Table 1

Summary statistics

This table reports the summary statistics (mean, median, standard deviation (SD), and 20th (P20) and 80th (P80) percentiles) for the key variables. The entire sample covers from August 19, 2019 to August 18, 2020. The sample during the COVID-19 Outbreak covers from January 11, 2020 to April 29, 2020.

	Mean	Median	SD	P20	P80
Panel A: Full Sample					
$MTT_{i,t}$	0.1222	0.1178	0.0547	0.0761	0.1626
$SST_{i,t}$	0.0025	0.0003	0.0067	0.0000	0.0032
Turnover	0.0224	0.0125	0.0288	0.0049	0.0328
Log(Market Value)	16.3516	16.2066	0.9823	15.5306	17.1132
$VI_{i,t}$	-0.0683	-0.2845	1.3467	-1.0929	0.8514
Panel B: During the COVID-19 Outbreak					
$MTT_{i,t}$	0.1224	0.1187	0.0524	0.0781	0.1618
$SST_{i,t}$	0.0024	0.0003	0.0061	0.0000	0.0032
Turnover	0.0266	0.0152	0.0330	0.0060	0.0392
Log(Market Value)	16.3431	16.2058	0.9792	15.5274	17.0880
$VI_{i,t}$	0.2687	0.0262	1.4285	-0.8657	1.3230
Panel C: Outside of the COVID-19 Outbreak					
$MTT_{i,t}$	0.1221	0.1174	0.0556	0.0753	0.1630
$SST_{i,t}$	0.0025	0.0003	0.0069	0.0000	0.0032
Turnover	0.0208	0.0116	0.0269	0.0046	0.0304
Log(Market Value)	16.3549	16.2069	0.9835	15.5324	17.1231
$VI_{i,t}$	-0.2006	-0.3893	1.2893	-1.1698	0.6401

Table 2

The effects of margin-trading and short-selling turnovers on the stock return volatility

This table reports the results from two stage least squares regressions for panel data about the effects of margin trading and short selling on the stock return volatility. The dependent variable is the stock return volatility innovation, which is the difference between the observed volatility and the forecasted volatility based on the historical average. $MTT_{i,t}$ is the margin-trading turnover. $SST_{i,t}$ is the short-selling turnover. $During_t$ is a dummy variable that equals to one from January 11, 2020 to April 29, 2020, and zero otherwise. IR_t is the infection risk, which is measured by the number of the COVID-19 daily confirmed cases. Turnover is daily trading volume scaled by the market value of tradable shares. Log(Market Value) is the logarithm of market value of shares outstanding. The sample covers from August 19, 2019 to August 18, 2020 in Columns (1) to (4), and from January 11, 2020 to April 29, 2020 in Columns (5) and (6). The numbers in parentheses are standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
$MTT_{i,t}$	0.413***		0.343***		0.322***	
	(0.048)		(0.056)		(0.116)	
$SST_{i,t}$		-0.165		0.107		-2.132**
		(0.383)		(0.430)		(0.975)
$MTT_{i,t} \times During_t$			0.285**			
			(0.114)			
$SST_{i,t} \times During_t$				-1.313		
				(0.964)		
$MTT_{i,t} \times IR_t$					0.084*	
					(0.049)	
$SST_{i,t} \times IR_t$						-2.124***
						(0.627)
$During_t$			0.341***	0.342***		
			(0.018)	(0.018)		
IR_t					-0.075***	-0.075***
					(0.002)	(0.002)
Turnover	12.074***	12.074***	12.111***	12.115***	10.843***	10.827***
	(0.101)	(0.101)	(0.101)	(0.101)	(0.212)	(0.212)
Log(Market Value)	1.299***	1.299***	1.294***	1.295***	1.559***	1.559***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.048)	(0.048)
Constant	-22.129***	-22.129***	-22.056***	-22.066***	-25.680***	-25.682***
	(0.220)	(0.220)	(0.220)	(0.220)	(0.788)	(0.788)
Month Fixed Effect	Y	Y	Y	Y	Y	Y
Firm Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	337,942	337,942	337,942	337,942	95,313	95,313
R-squared	0.220	0.220	0.221	0.221	0.119	0.119

find an average $MTT_{i,t}$ of 0.1222 and an average $SST_{i,t}$ of 0.0025 across firm days, indicating that margin trading is much more popular than the short selling in the Chinese stock market. In Panel B and Panel C, we report the summary statistics during and out of the COVID-19 outbreak, respectively. Interestingly, we observe that the volatility innovation ($VI_{i,t}$) is much higher during the COVID-19
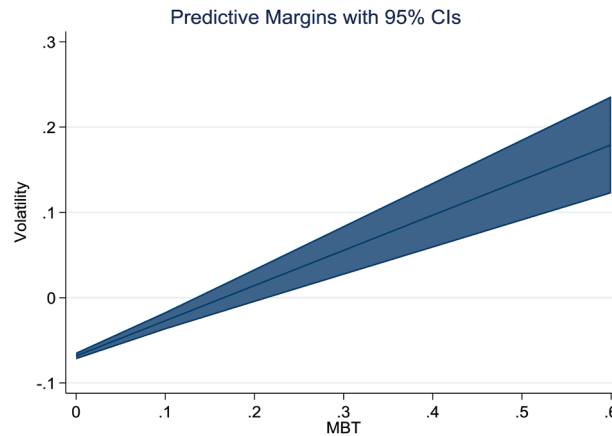
Fig. 1. The direct effect of margin purchases on stock return volatility.
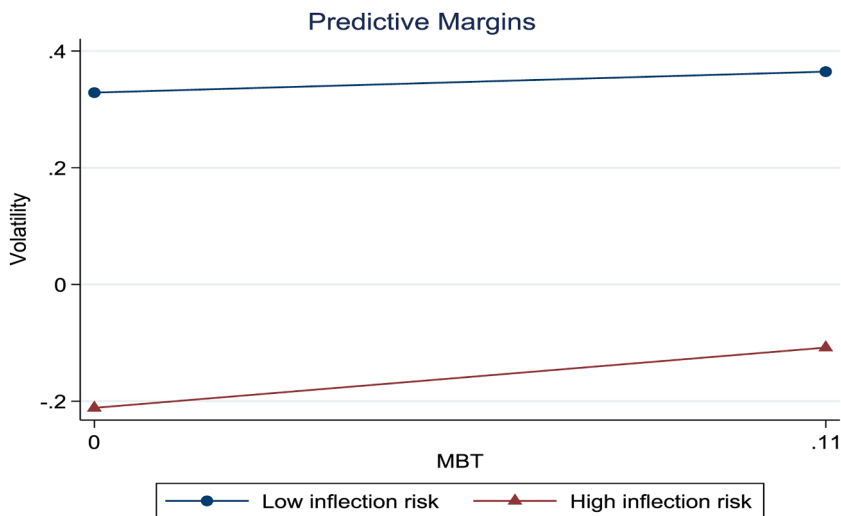

Fig. 2. The moderating effect of infection risk (margin purchases).

outbreak, indicating that the COVID-19 crisis exerts a negative effect on the market stabilization. This result is in line with the conclusion of Albulescu (2021) that the COVID-19 crisis enhances the financial markets' volatility.

In this paper, we aim to answer the effects of margin-trading and short-selling activities on the stock return volatility in the Chinese stock market. Table 2 presents the main empirical results. The stock return volatility innovation ($VI_{i,t}$) is the dependent variable across all specifications.

Columns (1) and (2) of Table 2 show the direct impacts of margin-trading and short-selling activities on the volatility innovations, respectively. The coefficient on the margin-trading turnover ($MTT_{i,t}$) is significantly positive. This result indicates that the purchase decisions of margin traders increase stock return volatility. Fig. 1 plots the average marginal effects of margin trading on the return volatility innovations. The upward-sloping line supports the findings that margin purchases destabilize share prices. This result is consistent with Chowdhry and Nanda (1998) that margin-trading activity leads to excess volatility because there may be multiple prices at which the market can be cleared. We observe that the coefficient on the short-selling turnover ($SST_{i,t}$), on the other hand, is insignificantly different from zero, suggesting that Chinese short sellers appear to have no destabilizing effect on the stock market in general. This result supports the empirical findings of Diether et al. (2009) and Saffi and Sigurdsson (2011) that short-selling activity does not lead to market destabilization.

Columns (3) and (4) provide the regression results after the consideration of the COVID-19 outbreak. To show whether the margin-trading and short-selling activities have significant effects on the market stabilization during the period with high market uncertainty, we interact $MTT_{i,t}$ and $SST_{i,t}$ with a dummy variable that indicates the COVID-19 outbreak period ($During_t$). The coefficient on $MTT_{i,t}*During_t$ is significantly positive, while that on $SST_{i,t}*During_t$ is insignificantly negative. These results indicate that margin-trading turnover further increases stock return volatility during the COVID-19 outbreak. However, we observe that an increase in short-selling activity is not significantly associated with higher price instability during the same period. These findings suggest that
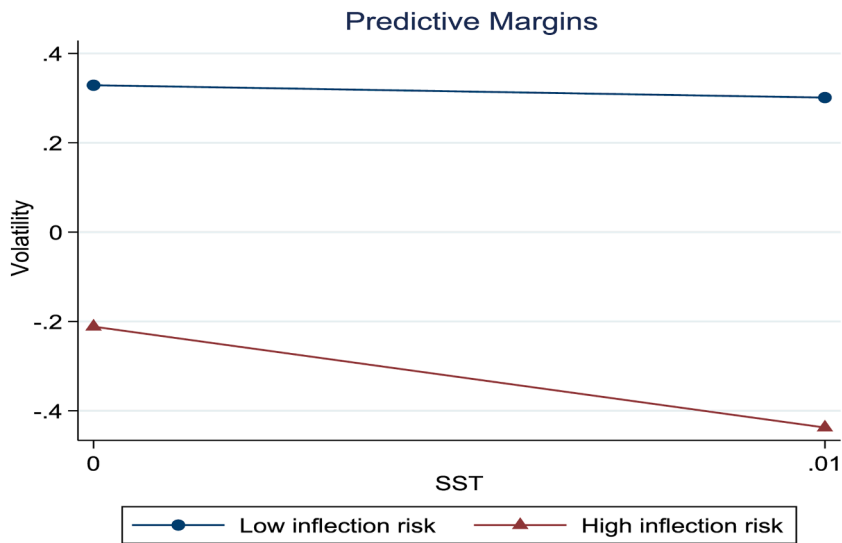
Predictive Margins

Fig. 3. The moderating effect of infection risk (short sales).

Table 3

The effects of margin-trading and short-selling turnovers on the stock return volatility – robustness checks

This table reports the results from two stage least squares regressions for panel data about the effects of margin trading and short selling on the stock return volatility. The dependent variable is the stock return volatility innovation, which is the difference between the observed volatility and the forecasted volatility based on the simple regression. $MTT_{i,t}$ is the margin-trading turnover. $SST_{i,t}$ is the short-selling turnover. $During_t$ is a dummy variable that equals to one from January 11, 2020 to April 29, 2020, and zero otherwise. IR_t is the infection risk, which is measured by the number of the COVID-19 daily confirmed cases. Turnover is daily trading volume scaled by the market value of tradable shares. Log(Market Value) is the logarithm of market value of shares outstanding. The sample covers from August 19, 2019 to August 18, 2020 in Columns (1) to (4), and from January 11, 2020 to April 29, 2020 in Columns (5) to (6). The numbers in parentheses are standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
$MTT_{i,t}$	0.923***		0.719***		0.651***	
	(0.083)		(0.096)		(0.202)	
$SST_{i,t}$		0.012		0.278		-3.293*
		(0.661)		(0.742)		(1.694)
$MTT_{i,t} \times During_t$			0.835***			
			(0.197)			
$SST_{i,t} \times During_t$				-1.266		
				(1.662)		
$MTT_{i,t} \times IR_t$					0.182**	
					(0.086)	
$SST_{i,t} \times IR_t$						-2.628**
						(1.090)
$During_t$			0.638***	0.638***		
			(0.030)	(0.030)		
IR_t					-0.141***	-0.141***
					(0.004)	(0.004)
Turnover	31.957***	31.957***	32.023***	32.033***	27.671***	27.652***
	(0.174)	(0.174)	(0.173)	(0.174)	(0.368)	(0.368)
Log(Market Value)	1.362***	1.362***	1.353***	1.354***	2.144***	2.145***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.084)	(0.084)
Constant	-20.106***	-20.106***	-19.959***	-19.986***	-31.595***	-31.610***
	(0.379)	(0.379)	(0.379)	(0.379)	(1.368)	(1.368)
Month Fixed Effect	Y	Y	Y	Y	Y	Y
Firm Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	337,942	337,942	337,942	337,942	95,313	95,313
R-squared	0.278	0.277	0.279	0.278	0.176	0.176

margin traders and short sellers play different roles in the stock return volatility when the market uncertainty is high. Specifically, during the COVID-19 outbreak, margin traders would be more pronounced to increase the speculative trading and destabilize the Chinese stock market. In contrast, short sellers are unlikely to contribute excessive return volatility.

Columns (5) and (6) of Table 2 exhibit the moderating effect of infection risk of the COVID-19 outbreak. We concentrate our

Table 4

The effects of margin-trading and short-selling statuses on the stock return volatility

This table reports the results from a difference-in-differences (DiD) approach for panel data about the effects of margin-trading and short-selling statuses on the stock return volatility. The dependent variable is the stock return volatility innovation, which is the difference between the observed volatility and the forecasted volatility based on the historical average. $D_{HighMTT,i,t}$ is a dummy variable that equals to one for firm i if its margin-trading turnover is ranked in the top quintile for each trading day t, and zero otherwise. $D_{HighSST,i,t}$ is a dummy variable that equals to one for firm i if its short-selling turnover is ranked in the top quintile for each trading day t, and zero otherwise. $During_t$ is a dummy variable that equals to one from January 11, 2020 to April 29, 2020, and zero otherwise. $D_{HighIR,t}$ is a dummy variable that equals to one if the COVID-19 daily confirmed cases is higher than the median value over the sample period. Turnover is daily trading volume scaled by the market value of tradable shares. Log(Market Value) is the logarithm of market value of shares outstanding. The sample covers from August 19, 2019 to August 18, 2020 in Columns (1) to (4), and from January 11, 2020 to April 29, 2020 in Columns (5) to (6). The numbers in parentheses are standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
$D_{HighMTT,i,t}$	0.058***		0.035***		-0.014	
	(0.005)		(0.006)		(0.015)	
$D_{HighSST,i,t}$		0.004		0.010		0.002
		(0.006)		(0.006)		(0.014)
$D_{HighMTT,i,t} \times During_t$			0.084***			
			(0.011)			
$D_{HighSST,i,t} \times During_t$				-0.021**		
				(0.011)		
$D_{HighMTT,i,t} \times D_{HighIR,t}$					0.158***	
					(0.019)	
$D_{HighSST,i,t} \times D_{HighIR,t}$						-0.095***
						(0.020)
$During_t$			0.312***	0.345***		
			(0.018)	(0.018)		
$D_{HighIR,t}$					-0.065***	0.002
					(0.012)	(0.013)
Turnover	12.027***	12.076***	12.045***	12.117***	10.870***	10.931***
	(0.101)	(0.101)	(0.101)	(0.101)	(0.213)	(0.213)
Log(Market Value)	1.299***	1.298***	1.291***	1.294***	1.666***	1.700***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.049)	(0.049)
Constant	-22.140***	-22.122***	-22.014***	-22.049***	-27.418***	-27.977***
	(0.220)	(0.220)	(0.220)	(0.220)	(0.794)	(0.792)
Month Fixed Effect	Y	Y	Y	Y	Y	Y
Firm Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	337,942	337,942	337,942	337,942	95,313	95,313
R-squared	0.221	0.220	0.222	0.221	0.110	0.109

analysis on the COVID-19 outbreak period, which is from January 11, 2020 to April 29, 2020. The coefficient on the interaction term of $MTT_{i,t}$ and IR_t is positive and significant, suggesting that the infection risk further amplifies the destabilizing effect of margin trading in the Chinese stock market. As Fig. 2 shows, in moving infection risk from a low (mean – 3S.D.) to a high level (mean + 3S.D.), the slope of margin trading on the return volatility becomes much steeper. This indicates that margin purchases stimulate return volatility when infection risk is high. Interestingly, we find in Column (6) that the coefficient on $SST_{i,t}$ is significantly negative, implying that short sellers stabilize the market during the COVID-19 outbreak period. Furthermore, the coefficient on the interaction term of $SST_{i,t}$ and COVID-19 daily confirmed cases (IR_t) is significantly negative. Fig. 3 illustrates the relationship between short selling and return volatility under a low level of infection risk (Mean – 3S.D.) and a high level of infection risk (Mean + 3S.D.). The slope of short selling on return volatility is steeper under high infection risk, indicating that the infection risk enhances the stabilizing impact of short selling on return volatility during the COVID-19 outbreak. The result suggests that short sellers, regarded as informed investors and are skilled at identifying mispriced securities by processing their superior information (Dechow et al., 2001; Asquith et al., 2005), reduce the possibility that the share prices to be further deviated from the intrinsic values and stabilize share prices when market uncertainty soars.

3.2. Robustness checks

We further show the robustness of our results to alternative measures. In the first robustness analysis, we follow Dimson and Marsh (1990) as well as Yu (2002) to forecast the stock return volatility based on a simple linear regression of the volatility at period $T+1$ on that at period T with a fixed sample size over the last 180 days. We then calculate the firm-level volatility innovation ($VI_{i,t}$) as the difference between the observed volatility and forecasted volatility, and repeat our previous analysis. The results are reported in Table 3.

The evidence in Table 3 is consistent with our previous findings that margin purchases and short sales have different effects on the stock return volatility in the Chinese stock market. Margin traders destabilize market prices, whereas short sellers contribute to market stabilization when the market uncertainty is high.

In the second robustness analysis, we create two dummy variables, $D_{HighMTT,i,t}$ and $D_{HighSST,i,t}$, to proxy the status of margin-trading

and short-selling activities and examine how they affect the stock return volatility. The results are reported in Table 4.

Consistent with our prior findings, we observe in Column (1) of Table 4 that stocks with margin-trading turnover in the top quintile exhibit higher stock return volatility. We still do not find supporting evidence in Column (2) that short sellers increase return volatility in general. However, the results in Column (3) to (6) based on a difference-in-difference (DiD) approach imply that the intensified margin-trading activity is associated with higher return volatility, while intensified short-selling activity is associated lower return volatility during the COVID-19 outbreak and when the infection risk is high.

To sum up, we find that short sellers and margin traders play different roles in the Chinese stock market. Specifically, short sellers are informative, and through short-selling activity, stock return volatility is decreased and stock market is stabilized when the market uncertainty soars. However, we show that margin traders act as speculators, and margin-trading activity is an important underlying source of excess return volatility.

4. Conclusion

We investigate the effects of margin trading and short selling on the stock return volatility in the Chinese stock market during the COVID-19 outbreak. Using daily data, we find that short sellers and margin traders have different roles in the Chinese stock market. Specifically, margin-trading activity is positively associated with the return volatility innovation, and the COVID-19 outbreak amplifies the destabilizing effect. However, no evidence shows that short sellers destabilize the stock market in general. We further conjecture that short selling effectively reduces stock return volatility when the infection risk is high during the COVID-19 outbreak. Therefore, Chinese policymakers should be careful to regulate and supervise margin-trading and short-selling activities, especially when the market uncertainty soars.

CRediT authorship contribution statement

Yongjia Lin: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Writing – original draft, Writing – review & editing. **Yizhi Wang:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Writing – original draft, Writing – review & editing. **Xiaoqing (Maggie) Fu:** Conceptualization, Investigation, Methodology, Formal analysis, Supervision, Writing – original draft, Writing – review & editing.

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References

Albulescu, C.T., 2021. COVID-19 and the United States financial markets' volatility. Finance Res. Lett. 38, 101699.
Asquith, P., Pathak, P.A., Ritter, J.R., 2005. Short interest, institutional ownership, and stock returns. J. Financ. Econ 78, 243–276.
Baek, S., Mohanty, S.K., Glambosky, M., 2020. COVID-19 and stock market volatility: an industry level analysis. Finance Res. Lett. 37, 101748.
Baker, S.R., Bloom, N., Davis, S.J., Kost, K., Sammon, M., Viratyosin, T., 2020. The unprecedented stock market reaction to COVID-19. Rev. Asset Pric. Stud. 10, 742–758.
Chang, E.C., Cheng, J.W., Yu, Y., 2007. Short-sales constraints and price discovery: evidence from the Hong Kong market. J. Finance 62, 2097–2121.
Chang, E.C., Luo, Y., Ren, J., 2014. Short-selling, margin-trading, and price efficiency: evidence from the Chinese market. J. Bank. Finance 48, 411–424.
Chowdhry, B., Nanda, V., 1998. Leverage and market stability: the role of margin rules and price limits. J. Bus. 71, 179–210.
Curtis, A., Fargher, N.L., 2014. Does short selling amplify price declines or align stocks with their fundamental values. Manage. Sci. 60, 2111–2380.
Dechow, P.M., Hutton, A.P., Meulbroek, L., Sloan, R.G., 2001. Short-sellers, fundamental analysis, and stock returns. J. Financ. Econ 61, 77–106.
DeLong, B., Shleifer, A., Summers, L., Waldmann, R., 1990. Positive feedback investment strategies and destabilizing rational speculation. J. Finance 45, 379–395.
Dhaliwal, D., Judd, J.S., Serfling, M., Shaikh, S., 2016. Customer concentration risk and the cost of equity capital. J. Account. Econ. 61 (1), 23–48.
Diether, K.B., Lee, K, Werner, I.M., 2009. It's SHO time! Short-sale tests and market quality. J. Finance 64, 37–73.
Dimson, E., Marsh, P., 1990. Volatility forecasting without data-snooping. J. Bank. Finance 14, 399–421.
Engelberg, J.E., Reed, A.V., Ringgenberg, M.C., 2012. How are shorts informed? Short sellers, news, and information processing. J. Financ. Econ 105, 260–278.
Friedman, M.J., 1953. Essays in positive economics. University of Chicago Press, Chicago.
Hardouvelis, G.A., Peristiani, S., 1992. Margin requirements, speculative trading, and stock price fluctuations: the case of Japan. Q. J. Econ. 107, 1333–1370.
Hart, O.D., Kreps, M.D., 1986. Price destabilizing speculation. J. Polit. Econ. 94, 927–953.
Henry, O.T., McKenzie, M., 2006. The impact of short selling on the price-volume relationship: evidence from Hong Kong. J. Bus. 79, 671–691.
Larcker, D.F., Rusticus, T.O., 2010. On the use of instrumental variables in accounting research. J. Account. Econ. 49, 186–205.
Liu, S., Du, J., Zhang, W., Tian, X., Kou, G., 2021. Innovation quantity or quality? The role of political connections. Emerg. Mark. Rev., 100819
Roberts, M.R., Whited, T.M., 2013. Endogeneity in empirical corporate finance. In: Constantinides, G.M., Stulz, R.M. (Eds.), Handbook of the Economics of Finance, vol.2, Elsevier, North Holland, Amsterdam.
Saffi, P.A.C., Sigurdsson, K., 2011. Price efficiency and short selling. Rev. Financ. Stud. 24, 821–852.
Seguin, P.J., 1990. Stock volatility and margin trading. J. Monet. Econ. 26, 101–121.
Shalen, C.T., 1993. Volume, volatility, and the dispersion of beliefs. Rev. Financ. Stud. 6, 405–434.
Stein, J.L., Hong, B.G., 1990. Price volatility and speculation. J. Account. Audit. Finance 5, 277–300.

Wooldridge, J.M., 2015. Introductory econometrics: a modern approach. Cengage Learn.

Yu, J., 2002. Forecasting volatility in the New Zealand stock market. Appl. Financ. Econ. 12, 193–202.

Zaremba, A., Kizys, R., Aharon, D.Y., Demir, E., 2020. Infected markets: novel coronavirus, government interventions, and stock return volatility around the globe. Finance Res. Lett. 35, 101597.