The Impact of COVID-19 on Firm's Financial Distress: Evidence from China

Peizhe Song[1, a, *]

[1]*Institute of Problem Solving, University Of Reading, Shinfield Street, Reading, Berkshire (of the institute)*
a. s979381055@163.com
*corresponding author

Abstract: COVID-19 has a significant influence on firm's financial distress. How does COVID-19 influence firms' short-term financial conditions and long-term development in China, and whether and to what extent will their financial leverage deviate from the original path? Can financing support from government as a bailout policy alleviate the financial distress caused by the epidemic? In order to exam my hypotheses, I did a series of exams. The sample includes all publicly listed Chinese firms from 2017 to 2022. Results show that the outbreak of Covid-19 makes firms more difficult to borrow money. H1 is supported. However, the interaction item has no corresponding data observation value. It is predicted to be positive, which means the politically connected firms are more likely to offset the bad influence of the external environment because they can access valuable financial resource easily than firms without political connections. It is not consistent with H2. The study not only extends the growing literature exploring the deep influence of the Covid-19 pandemic on business, but also has implications for policymakers.

Keywords: Covid19, financial distress, Chinese firms

1. Introduction

The sudden Covid-19 epidemic not only changed the traditional way of life and production of human beings, as the market micro-body of the enterprise's way of doing business has also changed a lot with. Affected by the epidemic, enterprises generally encounter multiple blows such as cash flow shortages, order cancellations, and supply chain interruptions. The original operating arrangements are difficult to maintain, and strategic planning needs to be adjusted urgently. In this context, how does COVID-19 influence firms' short-term financial conditions and long-term development in China, and whether and to what extent will their financial leverage deviate from the original path? Can financing support from government as a bailout policy alleviate the financial distress caused by the epidemic? This paper aims to answer these key questions through empirical analysis.

This paper mainly focuses on Chinese firms for two reasons. First, the COVID-19 epidemic and the corresponding control measures have been lasting three years in China, which inevitably cause profound impact on Chinese society and the business field. Second, loan difficulty and financial distress is an everlasting problem for Chinese firms. Lots of prior literature has discussed the causes and consequences but has not reached the agreement yet. The unexpected outbreak of the epidemic provides a unique setting to explore the financial distress problems.

The outbreak of infectious diseases in human history usually has a huge impact on social and economic development, and even changes the course of human development [1]. For example, the "SARS" epidemic (2003) and the "H1N1 influenza A" epidemic (2009) in the last 20 years caused economic losses of relevant countries as high as US $30 billion and US $1.86 billion respectively. The covid-19 pandemic is not only a global public health problem, but also a serious setback and impact on economic growth and development worldwide. The International Monetary Fund (IMF) said that the novel corona virus pandemic triggered an economic recession that the world had never experienced since the Great Depression of 192. Existing studies focus on the impact of COVID-19 on the financial asset price such as the US Treasuries, sovereign Eurobonds, corporate bonds, and stocks [2]. However, it remains unclear of the linking between COVID-19 and firms' financing activities. During the Covid-19 epidemic period, the ability of financing and borrowing is the significant for enterprises to relieve the pressure of cash flow and survive during this crisis and there is still uncertainty surrounding the impact of COVID-19 on firms' financing conditions.

A large number of studies have shown that in the Chinese market, which is dominated by socialist public ownership, the traditional constraints on corporate financing and the problem of political affiliation have led to the fact that private firms are often unable to produce and operate in accordance with the rules of market competition, which are two important issues that need to be resolved urgently in the course of the transformation of China's economic growth mode in the future [3]. In recent years, Chinese government has been committed to promoting the construction of a market system that solves the financing problems of firms and have made great efforts (Like articles 14 to 23 of the Law of the People's Republic of China on the Promotion of Small and Medium sized Enterprises.) in establishing a multi-level capital market, developing financial technology, and simplifying financing procedures. However, empirical facts tell us that the premise of the top-level design must be based on a great deal of investigation, research and evidence-gathering, and that it must follow the characteristics of a socialist market economy with Chinese characteristics in addition to traditional economic theories, and that it must fully incorporate the characteristics of the macro-environment and the micro-enterprises, and even the grass-roots practitioners, in the course of piloting. Financing constraints are still one of the key problems restricting the development of private enterprises at the current stage.

As the main part of China's real economy, corporations are the largest and most dynamic group in the real economy, especially the non-SOEs and private firms. Their development is related to the structural adjustment, transformation and upgrading of China's economy and society. By the end of 2021, the number of market entities registered nationwide has reached 154 million, including 48.423 million enterprises and 103 million self-employed businesses. As an important part of the market, non-SOEs and private firms have contributed more than 50% of fiscal revenue, more than 60% of GDP, more than 70% of technological innovation, and more than 80% of urban labor employment.

Through comparison, it can be found that there is a big difference in the treatment of private enterprises compared with state-owned enterprises when facing the problem of enterprise financing. The shortage of capitals has become a bottleneck restricting the development of firms. One of the main issues is the information asymmetry between enterprises and lending banks. Stiglitz and Weiss (1981) believe that information asymmetry is a common problem in the financial market. Formal financial institutions such as banks cannot identify the payment ability among loan applicants, which leads to adverse selection and moral hazard. Compared with large and state-owned firms, the problem of information asymmetry between private firms and banks is more serious, and they are more likely to be constrained by bank loan. During the period of Covid-19 epidemic period, the operation uncertainty for firms increases, which may further exacerbate the information asymmetry between borrowers and lending institutions. Therefore, how to solve the financing problems of Chinese firms during the epidemic crisis is an important problem that needs to focus on. The research question in this paper is what is the impact of COVID-19 on firm's financial distress? Given that government

plays a vital role in China, so do politically connected firms are more likely to offset the bad influence of the external environment?

There are some contributions in this paper. The study not only extends the growing literature exploring the deep influence of the Covid-19 pandemic on business, but also has implications for policymakers. First, the financial system is still not well developed in China, which hinders the operations of multiple firms. The private enterprises can alleviate the problem of bank loan difficulties by establishing political relationships. This relationship-based contract will help promote the development of private enterprises [4]. Second, financial institutions should have a better understanding of the operating conditions of firms, especially the non-political connected firms in industries that have been hit hard by the epidemic, and take more targeted measures to provide financial support for small and micro enterprises facing temporary difficulties. Third, as the epidemic continues to recur, it is recommended that government departments continue some existing policies to benefit enterprises and introduce new supportive policies based on the evolution of the epidemic and changes in market conditions to effectively help small and medium enterprises overcome obstacles.

2. Institutional Background in China

Since the emergence of the Covid-19 pandemic, Chinese businesses have been most worried about four things: a drop in demand, a rise in uncertainty, a break in their supply chain, a drop in capacity, closures, and the health of their employees [5]. After first showing up in Wuhan in December 2019, the Covid-19 pandemic quickly expanded over the whole country of China [6]. In order to stop the spread of this illness, the government put Hubei province under a strict lockdown. Self-quarantines and social isolation were also put in place [7]. Because of the strict quarantine rules and the tight lockdown in Hubei province, supply lines for Chinese companies were messed up. Businesses had to stop or cut back on what they did in order to make sure their employees were safe. During the first three months of 2020, there were a lot of confirmed deaths from this pandemic in the central, western and coastal parts of China. China's president in response to this health concern, said that preventing and controlling illness is more important than getting the economy back on track [7]. In this situation, the impact of the epidemic on enterprises is enormous, including financial problems [8]. Firstly, the epidemic has led to a reduction in sales, a shrinking market, a reduction in corporate income, a breakdown in the capital chain, financial pressure, increased business difficulties, and even the risk of bankruptcy. Firms in various places closed their production lines, which had a big effect on their supply chains. Secondly, supply chain problems. The supply of raw materials during the epidemic is tight, transportation is limited, production capacity is affected, and product quality is affected. The operation of enterprises is affected. Thirdly, human resources problems, the increase of employment pressure caused by the epidemic, the loss of employees, the operation of enterprises is affected. Fourthly, brand image problems, the damage of enterprise brand image caused by the epidemic, the decline of market trust has a negative impact on the operation of enterprises. To sum up, the impact of the epidemic on enterprises is enormous.

3. Literature Review and Hypotheses Development

There is a general consensus in existing research on large-scale pandemics that macroeconomic growth trends tend to take a turn for the worse when hit by pandemics, in the form of retreat, shrinkage of the real economy and massive unemployment [9]. One of the most obvious sectors hit by the pandemic was the cultural and tourism industry, which saw a sharp drop in revenue after the 2003 SARs, not only in China but also in many other countries around the world [10]. Building on this, later scholars have further shown that the structural impacts caused by large-scale epidemics may be

more severe than the aggregate impacts [11]. However, when responding to a pandemic, relying solely on prior experience may not be conducive to an effective response program for businesses, as this outbreak has completely different characteristics [12]. Existing studies of the new crown epidemic have been more skewed toward macro totals [12], but few empirical studies have explored the micro-level effects of how the pandemic influences firms financing constraints. In this section, three hypotheses are developed according to my overall consideration. Both the first and the second hypotheses form a highly correlated relationship with microenterprises financing themselves with bank loans, bond issues, and private placements. The third hypothesis test whether political connections would influence firm's ability to access loans or external finance during current pandemic crisis.

3.1. Crisis and Financial Constraints

Bank lending behavior during economic crisis has been widely studied in the prior literature [13]. Some scholars have argued that economic crises can interfere with the spontaneous process of allocating credit resources in markets under conditions of perfect competition by triggering high financing costs through the creation of asset shortages. In times of crisis [14], the supply of bank loans generally decreases. This decline may be due the environment uncertainty and shocks to borrower guarantees, which affects the ability of firms to raise capital when agency and information problems are significant.

The COVID-19 crisis has some similarities with the global financial crisis from 2007 to 2009, as both damage the global economy heavily through liquidity shortages, corporate bankruptcies, and unemployment. However, with the ongoing COVID-19 crisis indefinitely disrupting business revenue streams, businesses face fixed costs, including debt servicing, as well as declining cash balances. Deteriorating financial conditions make it harder for companies urgently in need of liquidity to obtain credit, as banks are reluctant to lend to borrowers with low credit quality and low asset values. Therefore, the outbreak of COVID-19 is expected to further limit a firm's access to external finance. I also expect firms to substitute for alternative sources of financing to compensate for the lack of access to bank credit. The credit supply shock theory suggests that credit-rationed firms are more likely to have higher impaired access to external capital during the crisis.

Based on the above discussion, I raise the following hypotheses.

H1a: The outbreak of Covid-19 has a negative impact on firm's external financing.

H1b: Firms are more likely to substitute bank credit with other financing instruments during the COVID-19 pandemic.

3.2. Political Connections and Financial Constraints

Previous literature provides growing evidence that political connections are valuable to firms in various countries [14]. One of the most important benefits is easier access to bank loans [15]. Due to the underdeveloped product and credit markets and the lack of institutions to support market development, the government often exercises strong control over the allocation of economic resources [16], resulting in private enterprises not being able to completely rely on the market to obtain economic resources. Bank credit is an indispensable key resource for enterprise development, but the financial system is mainly dominated by the four major state-owned banks in China. Although state-owned banks have begun to apply economic principles to make credit decisions with the continuous reform of the banking industry, the government as the ultimate owner of the bank still dominates the allocation of bank credit resources, leading to more allocation of bank credit resources to state-owned enterprises [4]. In addition, a large number of literatures have shown that Chinese banks have obvious credit discrimination against private enterprises [17]. As a result, many private enterprises are keen

to establish political relations, such as hiring current or former government officials, deputies to the National People's Congress or members of the Chinese People's Political Consultative Conference to join the company's board of directors.

Establishing political connections is important for private enterprises to obtain bank loans. The function of political connections is especially pronounced in China since the government has relatively large power to assign critical resources, and the legal environment is still weak [18]. First, in the absence of a formal legal and judicial system to effectively protect the property rights of private enterprises, economic disputes between enterprises or between enterprises and their creditors are often resolved by government officials rather than through courts [19]. In this way, enterprises with political connections can get the protection of government officials in case of economic disputes, reduce the operating risks of enterprises, and obtain bank loans more easily. Second, when the property rights of private enterprises face the threat of arbitrary infringement by the government or officials, enterprises with political connections can use their own political connections as an alternative property rights protection mechanism to avoid or reduce the property rights of enterprises from being violated by the government and officials. The arbitrary infringement of officials reduces the operating risk of enterprises, thereby reducing the risk level of bank loans to enterprises, thereby reducing the difficulty for these private enterprises to obtain bank loans [20]. Third, the relatively backward financial development makes it difficult for enterprises to obtain loans on a market-based basis, so they rely on political connections instead of formal channels to obtain loans. Private enterprises with political connections can provide loan support for enterprises through the influence of politicians on state-owned banks and overcome or reduce the problem of bank credit discrimination faced by enterprises. Therefore, under the same conditions, enterprises with political connections are more likely to obtain bank loans than those without political connections.

During the Covid-19 pandemic, the advantage of political connection for getting bank loans would be more pronounced. First, the supply of bank loans generally decreases in the crisis. Second, the deteriorating financial conditions make it harder for companies urgently in need of liquidity to obtain credit, as banks are reluctant to lend to borrowers without strong guarantees.

The discussion leads to the following hypothesis:

H2: The negative impact of Covid-19 crisis on financial constraints is less pronounced in politically connected firms.

4.   Research Design

4.1.   Data and Sample

The sample includes all publicly listed Chinese firms from 2017 to 2022 (Main board of Shanghai and Shenzhen stock markets) and processes them according to the following principles: (1) drop observations with missing variable data; (2) drop banks, insurance and other financial industry companies; (3) winsorize all continuous variables at the top and bottom percentile to avoid the impact of outliers on the research results. All firm-level characteristics comes from China Stock Market & Accounting Research Database (CSMAR), which includes the most comprehensive financial data about Chinses firms. The political connection data comes from the CNRDS (https://www.cnrds.com/) database. According to Siyoto and Sodik (2015), quantitative research employs a large number of numbers throughout the research process, from data collection through data interpretation and findings.

4.2.   Model Specification

This paper sets up the DID method to evaluate the impact of COVID-19 on firms' financial constraints. Model 1

Taking Wuhan's "closed city" (January 2020) as the time node, the independent variable is the dummy variable before and after the epidemic. For samples after January 2020, take 1, otherwise take 0. The coefficient therefore indicates the impact of COVID-19 on firms' financial credits.

The dependent variable measures the firms' ability to gain credit from banks and other informal institutions. Following prior literature, this paper mainly uses three proxies (1) Debt percent: the percentage of total bank loans (including short-term loans and long-term loans) to total assets; (2) Trade account: the percent of the sum of notes payable, accounts payable and accounts received to total assets at the end of the period; (3) SA index.

Model 2

Note: Size is 100 million yuan, and Age is years.

For the Controls, consistent with literature, this paper includes firm size (Size), profitability (ROA), and sales. To capture the impact of political power, a variable is included to indicate whether the firm is controlled by the state (SOE). This paper also includes year and industry fixed effects in all my specifications to control for common shocks that might impact firms' financial conditions.

To examine the role of pollical connections on the effect of covid-19 and financial constraints, this paper estimates the following model.

Model 3

The key variable of interest is PC, an indicator variable for political connection, which equals one if the firm's CEO or CFO has served as a government official or a party official currently or previously. Table 1 shows the definitions of variables.

-------Insert Table 1 about here -------

Table 1: Variable definitions.

Variable	definitions
Code	Company code
Year	Year of data report
Name	Name of the company
ACOVID19	Whether the year is after the epidemic, it is 0 before the epidemic and 1 after the epidemic.
Loc	Where the province is located
Fyear	Year of establishment
Age	Years of establishment of the company
SAI	SA=-0.737*Size+0.043*Size^2-0.040*Age
NP Ratio	(Notes payable+accounts payable+accounts received in advance)/total assets
Revenue	Company revenue
SOE	Nature of the company, 1 is state-owned or state-controlled and 0 is non-state-owned.
AP Ratio	Accounts payable/total liabilities
DebtRatio	Total liabilities/total assets
Asset	Total assets
ROA	Net interest rate of total assets

5. Results

5.1. Descriptive Statistics

Table 2 presents the descriptive statistics of variables. The mean value of Covid19 is 0.5071 and the standard deviation is 0.5000. The mean value and standard deviation of age are 19.2803 and 6.6875 respectively. This is consistent with prior study. The same holds for the measure of NPRation, which

has a mean of 0.0769 and a standard deviation of 0.1130. The mean value and standard deviation of Revenue are 96.0622 and 685.2653. All continuous variables are winsorized at 1% and 99%.

-------Insert Table 2 about here -------

Table 2: Describtive statistics.

Variable	Obs	Mean	Std.Dev.	Min	Max
ACOVID19	29,833	0.5071	0.5000	0.0000	1.0000
Age	29,833	19.2803	6.6875	-1.0000	67.0000
SAI	29,833	21872.6800	607269.1000	-5.7501	3.78e+07
NP Ratio	29,833	0.0769	0.1130	0.0000	0.9084
Revenue	29,833	96.0622	685.2653	-1.1486	33181.6800
SOE	29,833	0.2172	0.4124	0.0000	1.0000
AP Ratio	29,833	0.2698	0.1707	0.0000	0.9415
Asset	29,833	155.4026	852.5662	0.0476	27329.1000
ROA	29,833	5.2062	20.3326	-2164.5910	1221.1070

5.2. The Parallel Trend Test

This paper did a parallel trend test to plot the trend of the ratio of notes payable to total liabilities (NPRatio) at the end of the period between the treatment group (ACOVID19=1) and the control group (ACOVID19=0) with the Year. By observing the parallelism of two groups of trend lines, we can preliminarily judge whether parallelism exists. Similarly, for APRatio, two groups of data (debt ratio and NPRatio) in time series is similar. From Figure 1, 2 ,3 and 4 we can see that the change trend of debt ratio and NPRatio is quite similar.
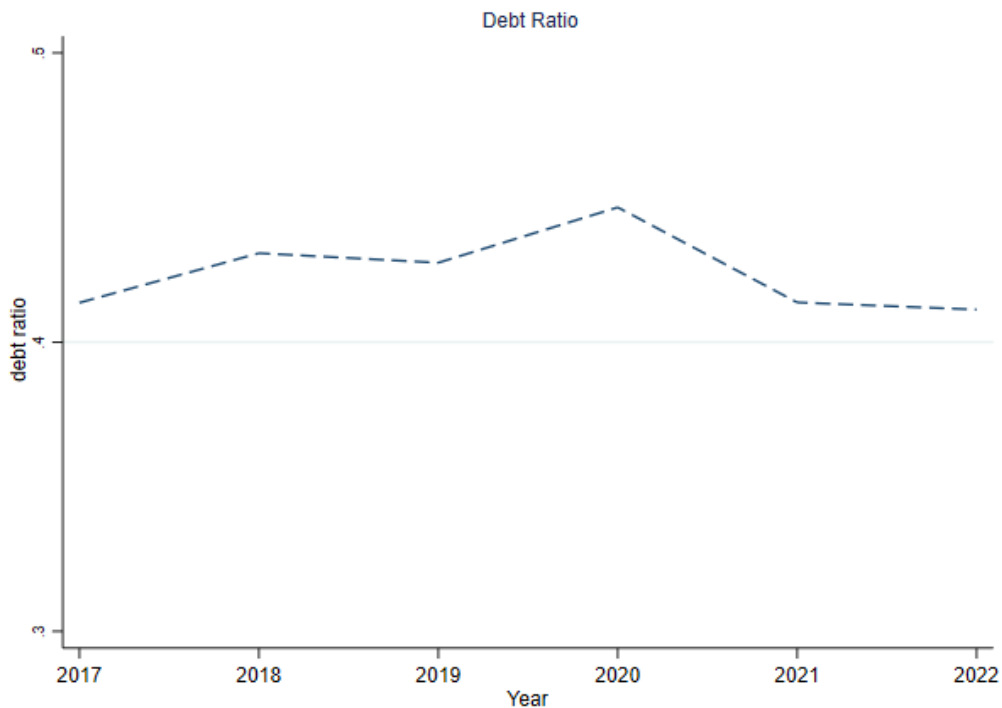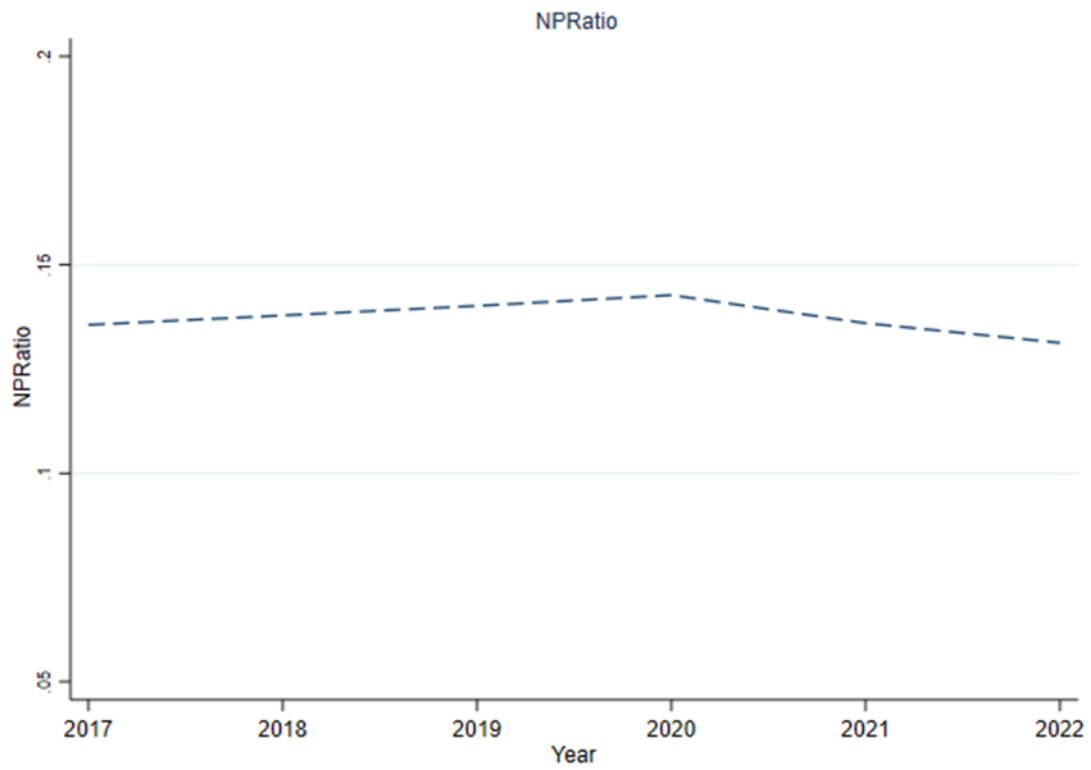

Figure 1: Parallel trend test (Debt Ratio).

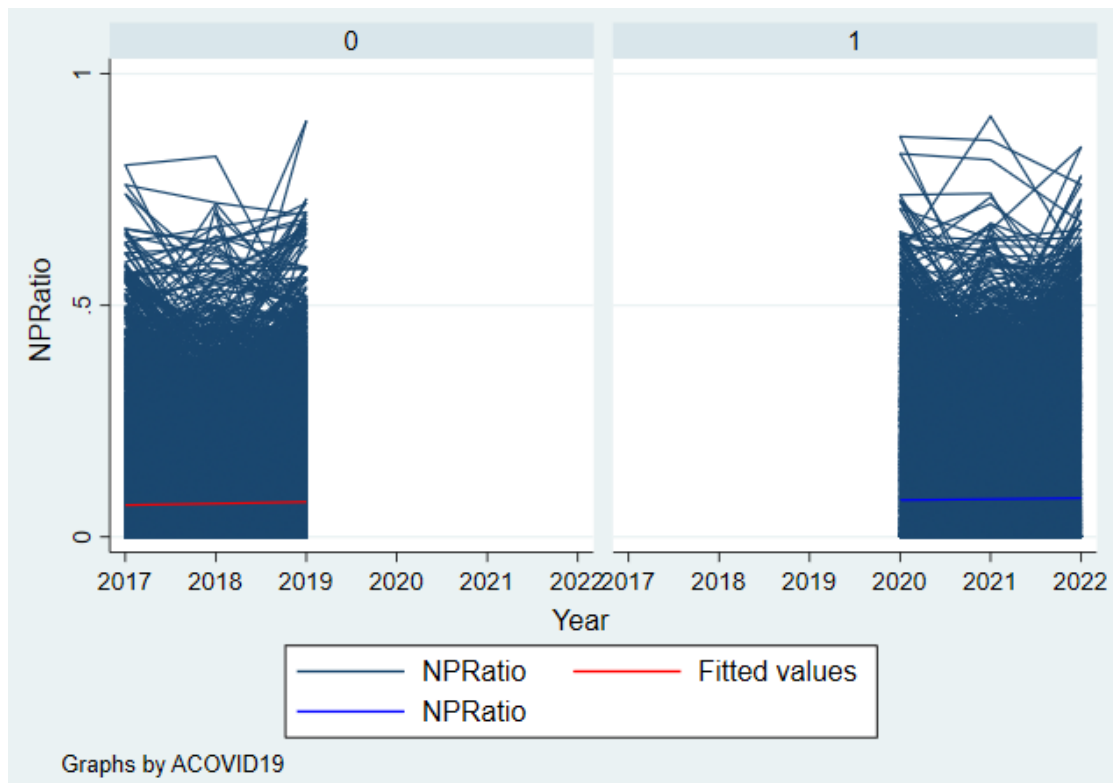Figure 2: Parallel trend test (NPRatio).
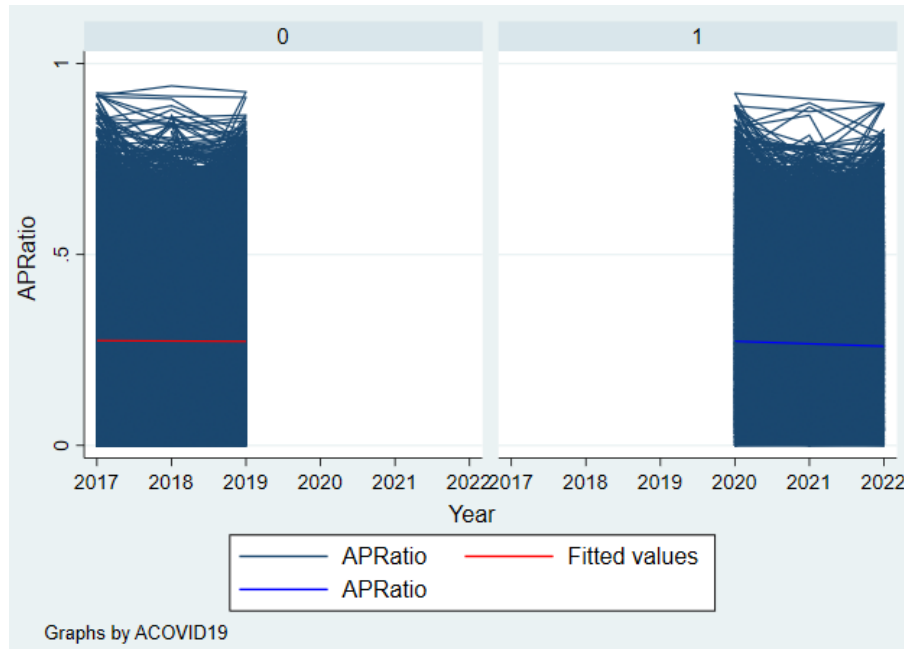

Figure 3: Parallel trend test.

Figure 4: Parallel trend test.

This paper also did regression, aiming at the data before the epidemic (acovid 19 = 0) and after the epidemic (acovid 19 = 1). As can be seen in Table 3 and 4, the existence of parallelism can be judged by testing whether the two groups of residuals (residuals0 and residuals1) are significantly different. Ttest command is used for t-test of residual difference. The parallel trend test was passed.

Table 3: The parallel trend test.

	Debt Ratio	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ACOVID19=0	ACOVID19	0	(omitted)				
	Year	0.0068	0.0038	1.78	0.074	-0.0007	0.0143
	_cons	-13.3090	7.6991	-1.73	0.084	-28.4003	1.7823
ACOVID19=1	ACOVID19	0	(omitted)				
	Year	-0.0177	0.0146	-1.21	0.225	-0.0462	0.0109
	_cons	36.1650	29.4432	1.23	0.219	-21.5473	93.8773

t statistics in parentheses
*p<0.05, ** p<0.01, **p<0.001

Table 4: Residual test.

Variable	obs	Mean	Std. Err	Std. Dev	[95% Conf. Interval]	
residu~0	29,833	-0.0104	0.0062	1.0751	-0.0226	0.0018
residu~1	29,833	-0.0258	0.0062	1.0754	-0.0380	-0.0136
diff	29,833	0.0154	0.0002	0.0419	0.0150	0.0159

5.3. Correlation Analysis

Table 5 list correlation analysis results between the variables. In Table 5, the correlation relationship between detraction and covid19 is strong (p<0.1). Debt Ratio is also significantly related with age and SAI. Debt Ratio has strong relation with NP Ration and Revenue. Also, the relations between

Debt Ratio and SOE, AP Ration, Asset and ROA. All other inter-correlation coefficients are below 0.4, suggesting that multicollinearity is also not a severe issue.

Table 5: Correlation matrics.

	(1) Debt Ratio	(2) Debt Ratio	(3) Debt Ratio	(4) Debt Ratio	(5) Debt Ratio	(6) Debt Ratio	(7) Debt Ratio	(8) Debt Ratio
ACOVID19	-0.00982* (-2.05)	-0.0101* (-2.11)	-0.00998* (-2.08)	-0.0157** (-2.63)	-0.0165* (-2.76)	-0.0172* (-2.89)	-0.0156 (-1.23)	-0.0157 (-1.23)
Age	0.00180*** (4.82)	0.00172*** (4.61)	0.00179*** (4.78)	0.00744*** (16.15)	0.00823*** (18.45)	0.00812*** (18.22)	0.00555*** (5.83))	0.00555*** (5.83)
SAI	7.59e-08*** (10.67)	7.51e-08*** (10.56)	5.73e-08*** (8.24)	3.98e-08*** (4.61)	3.42e-08*** (3.98)	2.40e-09 (0.50)	9.87e-09 (0.96)	
NP Ratio	4.943*** (395.69)	4.921*** (424.93)	4.919*** (423.87)	4.552*** (326.05)	4.552*** (325.83)	4.549*** (325.84)		
Revenue	-0.000143*** (-15.38)	-0.000142*** (-15.26)	-0.0000621*** (-10.01)	-0.0000412*** (-5.36)	-0.0000340*** (-4.46)			
SOE	-0.0208*** (-3.48)	-0.0214*** (-3.57)	-0.0159** (-2.66)	0.0492*** (6.66)				
AP Ratio	-1.833*** (-125.66)	-1.821*** (-126.65)	-1.831*** (-127.21)					
Asset	0.0000632*** (11.56)	0.0000629*** (11.50)						
ROA	0.000575*** (4.61)							
_cons	0.214*** (24.60)	0.219*** (25.29)	0.221*** (25.56)	-0.344*** (-37.29)	-0.349*** (-37.87)	-0.348*** (-37.83)	0.325*** (16.94)	0.325*** (16.96)
N	29833	29833	29833	29833	29833	29833	29833	29833
R-sq	0.859	0.859	0.858	0.781	0.781	0.781	0.001	0.001

5.4. Heterogeneity Test (Interactive Regression)

The significance of ACOVID19 of interaction items is tested. The interaction term ACOVID19 is added to the DID regression model to test whether the interaction effect between the treatment group and the Year is significant. The test arm command is used to test the significance of interactive items.

5.5. Test the Hypothesis of Regression Model

Ordinary regression analysis is carried out, and then the normality test, multicollinearity test, heteroscedasticity test and residual autocorrelation test are carried out by using estat command.

From Table 6, we can see that the coefficient on Covid which tests the impact of the Covid-19 pandemic on Chinse firms' financial distress is negative and statistically significant (β = -0.01, t=-2.11, p = 0.035). It indicates that the outbreak of Covid-19 makes firms more difficult to borrow money. This is due to government policies that, for example, limit tourist visits and restrictions on community activities so that many companies in the hotel, restaurant, and tourism subsector are temporarily closed. The closure caused a decrease in the company's financial performance.

Other variables are consistent with my expectation. Adjusted R-squared is 0.8589, F value is 22696.1, suggesting that the goodness of fit of the model is good. By examine Model 1, H1 is supported. These outcomes are similar to the research conducted by Armadani et al. (2021). The results of his research show that companies experiencing financial problems have increased during the COVID-19 pandemic.

Table 6: Test the hypothesis of regression model.

DebtRatio	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ACOVID19	-0.0101	0.0048	-2.11	0.035*	-0.0195	-0.0007
Age	0.0017	0.0004	4.61	0.000***	0.0010	0.0025
SAI	7.51e-08	7.11e-09	10.56	0.000***	6.12e-08	8.90e-08
NP Ratio	4.9215	0.0116	424.93	0.000***	4.8988	4.9442
Revenue	-0.0001	9.28e-06	-15.26	0.000***	-0.0002	-0.0001
SOE	-0.0214	0.0060	-3.57	0.000***	-0.0331	-0.0096
AP Ratio	-1.8215	0.0144	-126.65	0.000***	-1.8497	-1.7933
Asset	0.0001	5.47e-06	11.50	0.000***	0.0001	0.0001
_cons	0.2186	0.0086	25.29	0.000***	0.2016	0.2355

t statistics in parentheses
*p<0.05, ** p<0.01, **p<0.00

5.6. Strategic Descriptions About Company Change

According to the regression results, as we can see in Table 7, I can draw some strategic descriptions about company changes, especially in the period around 2019. The following is a policy description of the results.

For ACOVID19 (year after epidemic) variable, the coefficient of this variable is -0.01, which has a significant level (P<0.05). Research shows that the companies after the epidemic have changed compared with those before the epidemic. I can further explore and compare these changes and formulate corresponding strategies to adapt to the impact of the epidemic.

For age variable, the coefficient of this variable is 0.0018, which has a significant level (P<0.05). The number of years the company was established has an impact on the company's changes. Younger companies may face different challenges and opportunities and need to make corresponding strategies and development plans according to their characteristics.

For SAI variable, the coefficient of this variable is 7.59e-08, which has a significant level (P<0.05). SAI indicators have a certain impact on company changes. The company can further study and optimize the SAI index to improve the company's performance and competitiveness.

For NPRatio ((notes payable+accounts payable+accounts received in advance)/total assets) variable, the coefficient of this variable is 4.9431, which is significant (P<0.05). NPRatio indicators have an important impact on company changes. Companies can pay attention to and manage assets

related to bills, accounts and advance receipts to maintain good financial status and asset utilization efficiency.

For revenue variable, the coefficient of this variable is -0.0001, which has a significant level (P<0.05). Revenue plays an important role in company changes. Companies should pay attention to and seek strategies to increase revenue, such as market expansion, product innovation, marketing and promotion, so as to promote the company's development and growth. Other variables: SOE (nature of the company), APRatio (accounts payable/total liabilities), Asset (total assets) and ROA (net interest rate of total assets) also have a significant impact on the changes of the company. According to the coefficient and significance level of these variables, the company can further optimize its nature, responsible structure, asset management and profit rate to meet the changing needs of the company. Specifically, I can optimize the company's nature and governance structure, improve the accounts payable management and debt structure, effectively manage and utilize the company's total assets, and increase the net interest rate of total assets. Through the comparison of the changes after the epidemic, considering the impact of the epidemic on the company, especially the significance of the ACOVID19 variable, the company should focus on the changing trend after the epidemic, evaluate its impact and adjust its business strategy accordingly. Among them, young companies have different characteristics and challenges, which need to promote their stable growth and long-term development. For financial status and asset utilization, it is particularly necessary to pay attention to the influence of NPRatio variables on the company's changes. The company should pay attention to and manage assets related to bills, accounts and advance receipts to ensure good financial status and improve asset utilization efficiency. In addition, the company needs to improve its revenue level. Revenue is very important to the company's changes, so the company should take corresponding measures, such as market expansion, product innovation, marketing and promotion, so as to increase revenue and promote the company's development and growth. In addition, for optimizing the corporate nature and governance structure, I observed the significance of SOE variables. Companies can evaluate and optimize their corporate nature and governance structure, and introduce corresponding capital composition to improve their survival rate and competitiveness.

Table 7: Tests of H 1.

Debt Ratio	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ACOVID19	-0.0098	0.0048	-2.05	0.040*	-0.0192	-0.0004
Age	0.0018	0.0004	4.82	0.000***	0.0011	0.0025
SAI	7.59e-08	7.11e-09	10.67	0.000***	6.19e-08	8.98e-08
NP Ratio	4.9431	0.0125	395.69	0.000***	4.9186	4.9676
Revenue	-0.0001	9.28e-06	-15.38	0.000***	-0.0002	-0.0001
SOE	-0.0208	0.0060	-3.48	0.001***	-0.0325	-0.0091
AP Ratio	-1.8328	0.0146	-125.66	0.000***	-1.8614	-1.8042
Asset	0.0001	5.47e-06	11.56	0.000***	0.0001	0.0001
ROA	0.0006	0.0001	4.61	0.000***	0.0003	0.0008
_cons	0.2139	0.0087	24.60	0.000***	0.1969	0.2310

t statistics in parentheses
*p<0.05, ** p<0.01, **p<0.00

5.7. The Influence of Enterprise Nature on DebtRatio

In Table 8, the coefficient of SOE variable is -0.0121, but it does not reach the level of P<0.05 in statistical significance (P>0.05). The results show that the influence of enterprise nature (state-owned or non-state-owned) on DebtRatio is not statistically significant. This means that SOE has no obvious influence on the relationship between total liabilities and total assets in this study.

The influence of the interaction between enterprise nature and ACOVID19 on DebtRatio. The coefficient of the interaction term (Acovid 19*SOE) between Acovid 19 and SOE is -0.0162, which is not statistically significant (P>0.05).

When considering the interaction between epidemic situation and enterprise nature, the statistical analysis results show that the interaction has no significant influence on DebtRatio. Therefore, it can be considered that the nature of the enterprise and the epidemic situation have no obvious interactive influence on the relationship between total liabilities and total assets.

According to the above regression results, SOE and the interaction between SOE and the epidemic did not show significant influence on DebtRatio. This means that in this study, the nature of the company and the degree of political connection did not have a statistically significant impact on the relationship between total liabilities and total assets.

Table 8: Strategic description of company change.

Debt Ratio	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ACOVID19	-0.0063	0.0054	-1.17	0.242	-0.0169	0.0043
SOE	-0.0121	0.0085	-1.42	0.156	-0.0288	0.0046
ACOVID19*SOE 1 1	-0.0162	0.0114	-1.43	0.154	-0.0385	0.0061
Age	0.0018	0.0004	4.79	0.000***	0.0012	0.0025
SAI	7.56e-08	7.11e-09	10.63	0.000***	6.16e-08	8.95e-08
NP Ratio	4.9432	0.0125	395.70	0.000***	4.9187	4.9677
Revenue	-0.0001	9.29e-06	-15.35	0.000***	-0.0002	-0.0001
AP Ratio	-1.8325	0.0146	-125.63	0.000***	-1.8611	-1.8039
Asset	0.0001	5.47e-06	11.56	0.000***	0.0001	0.0001
ROA	0.0006	0.0001	4.62	0.000***	0.0003	0.0008
_cons	0.2122	0.0088	24.17	0.000***	0.1950	0.2294

t statistics in parentheses
*p<0.05, ** p<0.01, **p<0.00

5.8. The Influence of Political Relevance

For political relevance, according to the regression results, I can see that the influence of the new parameter "political" on "DebtRatio" (total liabilities/total assets). Table 9 exams H2 and the influence of political relevance on DebtRatio.

The coefficient of political variable is 0.0128, but the statistical significance is not up to the level of P<0.05 (P>0.05). Therefore, the influence of political relevance on DebtRatio is not statistically significant. This means that in this study, the degree of political connection of the company has no obvious influence on the relationship between total liabilities and total assets.

In terms of the influence of the interaction between ACOVID19 and political on DebtRatio, in the regression results, the interaction item (ACOVID19 * political) between Acovid 19 and Political is marked as (1 1), but this interaction item has no corresponding data observation value. It is predicted to be positive, which means the politically connected firms are more likely to offset the bad influence of the external environment because they can access valuable financial resource easily than firms without political connections.

Therefore, based on the above results, political relevance has no significant influence on the Debt Ratio between the company's total liabilities and total assets. In addition, due to the lack of observation values of ACOVID19 and political relevance of 1 at the same time, it is impossible to draw the conclusion that the interaction term affects DebtRatio. However, this may also be the

deviation of the data itself, and sufficient data need to be further supplemented for further research. H2 is not supported.

Table 9: Tests of H2.

Debt Ratio	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ACOVID19	-0.0068	0.0051	-1.34	0.179	-0.0168	0.0031
political	0.0128	0.0085	1.50	0.132	-0.0039	0.0294
ACOVID19*political 1 1	0	(empty)				
Age	0.0014	0.0004	3.93	0.000***	0.0007	0.0021
SAI	7.77e-08	7.09e-09	10.96	0.000***	6.38e-08	9.16e-08
NP Ratio	4.9428	0.0124957	395.56	0.000***	4.918303	4.967287
Revenue	-0.0001	9.28e-06	-15.49	0.000***	-0.000162	-0.0001256
AP Ratio	-1.8280	0.0146	-125.55	0.000***	-1.8565	-1.7994
Asset	0.0001	5.45e-06	11.30	0.000***	0.0001	0.0001
ROA	0.0006	0.0001	4.72	0.000***	0.0003	0.0008
_cons	0.2127	0.0088	24.22	0.000***	0.1955	0.2299

t statistics in parentheses
*p<0.05, ** p<0.01, **p<0.00

6. Conclusion

This paper aims to answer following key questions through empirical analysis. How does COVID-19 influence firms' short-term financial conditions and long-term development in China, and whether and to what extent will their financial leverage deviate from the original path? Can financing support from government as a bailout policy alleviate the financial distress caused by the epidemic? In order to exam our hypotheses, I did a series of texts. The sample includes all publicly listed Chinese firms from 2017 to 2022.

Based on research on differences in financial distress conditions in companies before and during the COVID-19 pandemic the following conclusions are obtained. Results show that the outbreak of Covid-19 makes firms more difficult to borrow money. H1 is supported. However, the interaction item has no corresponding data observation value. It is predicted to be positive, which means the politically connected firms are more likely to offset the bad influence of the external environment because they can access valuable financial resource easily than firms without political connections. It is not consistent with H2. COVID-19 pandemic has had a negative impact on firm's financal performance in China.

The study not only extends the growing literature exploring the deep influence of the Covid-19 pandemic on business, but also has implications for policymakers. This study is also anticipated to assist investors in determining a company's financial health, which can be utilized to make investment decisions. In addition, this research can be used as information for companies experiencing financial distress conditions so that they can immediately make changes to be able to maintain their companies in the future.

References

[1] Doyle, P. T. Devendra, C. Pearce, G. R., 1986. Rice straw as a feed for ruminants. International Development Program of Australian Universities and Colleges.
[2] Baek, S., Mohanty, S. K., & Glambosky, M. (2020). COVID-19 and stock market volatility: An industry level analysis. Finance research letters, 37, 101748.

[3]   Poncet, S., Steingress, W., & Vandenbussche, H. (2010). Financial constraints in China: Firm-level evidence. China Economic Review, 21(3), 411-422.

[4]   Allen, F., Qian, J., & Qian, M. (2005). Law, finance, and economic growth in China. Journal of financial economics, 77(1), 57-116.

[5]   Hassan, T. A., Hollander, S., Van Lent, L., Schwedeler, M., & Tahoun, A. (2020). Firm-level exposure to epidemic diseases: Covid-19, SARS, and H1N1. National Bureau of Economic Research, Issue w26971.

[6]   Bloomberg, 2020. China's Economy Suffers Historic Slump Due to Virus Shutdown. [Online] Available at: https://www.bloomberg.com/news/articles/2020-03-16/china-manufacturing-and-retail-contract-for-first-time-on-virus.

[7]   Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus and COVID-19 outbreak: A review. International Journal of Surgery, 78, 185–193.

[8]   Schleicher, A. (2020). The impact of COVID-19 on education insights from education at a glance 2020. Retrieved from oecd. org website: https://www.oecd.org/education/the-impact-of-covid-19-on-education-insights-education-at-a-glance-2020.pdf.

[9]   Potter, C. W. (2001). A history of influenza. Journal of applied microbiology, 91(4), 572-579.

[10]   Keogh-Brown, Marcus R., Henning Tarp Jensen, William John Edmunds, and Richard D. Smith. 2020. The impact of Covid-19, associated behaviours and policies on the UK economy: A computable general equilibrium model. SSM-Population Health 12: 100651.

[11]   Chou, K. C. (2004). Structural bioinformatics and its impact to biomedical science. Current medicinal chemistry, 11(16), 2105-2134

[12]   Faria-e-Castro, M. (2021). Fiscal policy during a pandemic. Journal of Economic Dynamics and Control, 125, 104088.

[13]   Atahau, A. D. R., & Cronje, T. (2020). Bank lending: The bank ownership focus in the pre-and post-global financial crisis periods. Economic Systems, 44(4), 100813.

[14]   Faccio, M., Masulis, R. W., & McConnell, J. J. (2006). Political connections and corporate bailouts. The journal of Finance, 61(6), 2597-2635.

[15]   Goldman, E., Rocholl, J., & So, J. (2013). Politically connected boards of directors and the allocation of procurement contracts. Review of Finance, 17(5), 1617-1648.

[16]   McMillan, S. M. (1997). Interdependence and conflict. Mershon International Studies Review, 41(Supplement_1), 33-58.

[17]   Gordon, R. H., & Li, W. (2003). Government as a discriminating monopolist in the financial market: the case of China. Journal of Public Economics, 87(2), 283-312.

[18]   Fisman, D. N., Reilly, D. T., Karchmer, A. W., & Goldie, S. J. (2001). Clinical effectiveness and cost-effectiveness of 2 management strategies for infected total hip arthroplasty in the elderly. Clinical Infectious Diseases, 32(3), 419-430.

[19]   Walder, A. G. (1995). Local governments as industrial firms: an organizational analysis of China's transitional economy. American Journal of sociology, 101(2), 263-301.

[20]   Bai, C. E., Lu, J., & Tao, Z. (2006). The multitask theory of state enterprise reform: Empirical evidence from China. American Economic Review, 96(2), 353-357.