Estimation of Default Scale of 2020 Credit Bonds Under the Influence of Epidemic

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ABSTRACT
The continuous impact of the 2019 novel coronavirus（2019-nCov） may increase the pressure of credit debt risk prevention and control in 2020.First, the epidemic will weaken the ability of enterprises to make profits and raise funds through such channels as impacting consumption, affecting production, reducing economic growth expectations and market risk contagion. Second, in 2020, it is expected that the overall maturity repayment scale of credit bonds will increase unabated, and the pressure on maturity repayment would have been great. Road transport, catering and tourism, food and beverage, culture and media and other industries are greatly affected by the epidemic in the short term. In recent years, the scale of bond default in the food and beverage industry has continued to rise, and this year may become a major disaster area for bond default. In recent years, there are few bond defaults in Hubei Province, the maturity scale of the existing credit bonds is stable in 2020, and the default risk is expected to be controllable. However, we still need to be alert to the black swan impact caused by the uncertain prospect of epidemic prevention and control.
With the continuous development of macro policies in recent years, market risks have been effectively mitigated and liquidity has been greatly enhanced. In the next step, it is necessary to follow up and study the business status and cash flow of the enterprises affected by the epidemic, identify the short-term problems caused by the force majeure of the epidemic and the business problems of the enterprises themselves, so as to provide a reference for the rescue. Consider to promote zero coupons, preferred stock, high-yield debt and other products that are conducive to balancing the term structure of corporate cash flow.
Keywords: *2019-nCov, credit bonds, default, Estimation*

1. INTRODUCTION

At the beginning of the new year, the 2019 novel corona virus (hereinafter referred to as 2019-nCov) broke out in Wuhan and spread across the country. The central government and various provinces and cities successively issued emergency measures to stop the spread of the epidemic. 2019 - nCov leads to the slowdown of current production and operation activities, and its short-term impact on the economy is expected to exceed that of SARS. First, the hidden nature of infection and the Spring Festival transportation and other factors make the prospect of epidemic prevention and control more difficult to predict. Second, the current economy is facing a complex downward situation. The impact of the black swan incident on the real economy is more likely to be amplified and transmitted. It is predicted that the long-term positive situation of China's economy has not changed, but 2019-nCov has increased the pressure of short-term cash flow and structural transformation of enterprises, and may expand the scale of bond market default, which is worthy of attention.
Specifically the epidemic will affect bond default rate in three ways: 2019 - nCov led to the temporary slowdown of production and consumption, the decline of business efficiency, especially the impact on the service industry, and the market was once pessimistic. These negative effects can affect the bond default rate from three channels.
First, the decrease of economic expectation, the exposure of stock pledge risk and the increase of enterprise financing cost may aggravate the risk of bond default
2019-nCov's short-term impact on the economy may surpass SARS, with the economic growth forecast lowered in the first quarter. However, the proportion of tertiary industry in China is 53%, up 13 percentage points from 40% in 2003. In addition, the World Health Organization declared 2019-nCov an international public health emergency on January 30, which may have a negative impact on short-term exports. The reduction of consumption and export will also affect the upstream and downstream industrial chains. On the whole, the short-term impact of 2019-nCov on the economy should exceed that of SARS, and the growth rate of GDP of China in the first quarter is expected to be reduced to between 4% and 5%.
The stock market is facing short-term downward pressure, which may expand the risk exposure of pledge, raise the financing cost of enterprises, and accelerate the occurrence of enterprise credit default risk events. On the one hand, the uncertainty of epidemic prevention and control, the

reduction of economic growth expectation, and the negative impact of epidemic on some industries will all be reflected in the secondary stock market. After the opening of A-share market, the opening decline was more than 8%. Although the subsequent market rebounded, it may still be due to the continuous decline of the share price of some companies, the exposure of stock pledge risk, or the acceleration of the occurrence of corporate credit default events. On the other hand, under the adverse influence of the industry as a whole, the financing cost and financing difficulty of enterprises will increase, so it is necessary to pay attention to the possibility that the default rate of corporate bonds in relevant industries will rise rapidly.

Second, tourism, catering, road transport, cultural media, food and beverage industries are significantly affected by the epidemic.

From the perspective of the impact of SARS epidemic, the short-term negative impact of the epidemic on the tertiary industry is greater than that of the secondary industry. In April and May 2003, the SARS epidemic was the most serious, and most of the service industry prosperity indexes in China's industrial development and growth prosperity index declined. Among them, the tourism industry showed a significant negative growth, the catering industry fell by 17 percentage points, and the business fell by 12 percentage points. The SARS epidemic had no impact on the secondary industry. The growth momentum of high growth industries represented by automobile and machinery remained unchanged, while the economic index of pharmaceutical manufacturing industry increased by 10 percentage points, and the prosperity index of biological and biochemical products manufacturing industry increased by 20 percentage points.

2019 - nCov has caused negative impact on road transport, catering tourism, food and beverage, cultural media and other service industries, and the scale of bond default in the industry is likely to expand. Under the situation of epidemic prevention and control, tourism and catering industries bear the brunt. Scenic spots around the country have been announced to be temporarily closed. Travel agencies will also suspend group tours, including outbound tours. The operating efficiency of tourism industry has declined rapidly. The cultural media industry has also suffered heavy losses. Take the film industry for example, the box office of the Spring Festival in 2019 was 5.859 billion, and the box office of the first day of the lunar New Year in 2020 was only 1.81 million. The restrictions on personnel and logistics also have a negative impact on the road transport industry, greatly reducing the operating efficiency of the industry, and the future debt service pressure increases sharply.

Third, the epidemic affected the daily operation of enterprises and financial institutions, and we should be alert to the increase of bond default due to technical problems

Under the influence of the epidemic, the flow of personnel is limited and the financial services are not smooth, which leads to the untimely collection of corporate funds. In addition, with the large-scale maturity of bonds, technical problems may lead to the increase of bond scale. According to the epidemic prevention and control plan, all kinds of enterprises and institutions have different degrees of delay in the start-up time, including the inter-bank market and exchange market extended to February 3, and the start-up time of some enterprises should not be earlier than February 9. In February and March, the credit bond market will usher in the peak period of debt repayment. Due to the rigid demand of enterprises for funds, the postponement of resumption of work may bring the risk of capital chain rupture to some enterprises with tight funds, which will lead to the increase of default scale of relevant credit bonds.

1.1. Related Work

The main research results related to the causes of bond default risk are as follows:

Merton [1] is the first scholar to study the default risk of corporate bonds. Based on the study, Merton found that the main factors affecting the default of corporate bonds or corporate bonds are the company's financial position and cash flow rate; on the basis of this study, Jarrow He et al. [2] further enriched the influencing public factors of bond default, and found that the fluctuation of market value and the fluctuation of fair value of fixed assets are also important factors to determine whether corporate bonds default Based on the previous research, Bakshi et al. [3] constructed the measurement model from the financial management indicators of the company to study the financial indicators that can significantly affect the high risk of bond default. It is found that the size of corporate financial leverage has a significant contribution to the risk of bond default. The higher the corporate financial leverage is, the worse the financial stability is, and the higher the risk of bond default is. In recent years, Harris [4]explored the determinants of default risk from the perspective of rights and obligations of debt and claims, and found that bond deed terms are more reasonable in the use of parent company. Giesecke [5] found that credit markets is the large difference between probabilities of default calculated from historical data and probabilities of default.

2. METHOD

In order to estimate the maturity repayment scale of the credit bond market in 2020, we make two assumptions: first, the external economic environment is basically unchanged; second, the bonds due within one year are issued in the form of short-term bonds and paid in the same year.

2.1. Equations

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$$\psi = \alpha\chi + \beta \qquad (1)$$

In 2020, the repayment scale of credit bonds should be the sum of the maturity repayment amount of existing stock credit bonds and the maturity repayment amount of short-term bonds issued in the current year. In 2020, the maturity and repayment scale of the existing credit bonds will be 8.48 trillion yuan. According to the change of the repayment scale of short-term bonds in the past six years, it can be simply calculated that the expected repayment scale of short-term bonds this year is about 4.08 trillion. If the short-term debt service scale is estimated by a standard deviation interval, the debt service scale of short-term bonds should be between 3.43 trillion and 4.73 trillion this year. It is calculated that the final maturity scale of credit bonds this year is estimated to be between 11.91 and 13.21 trillion, which are higher than that of 2019.

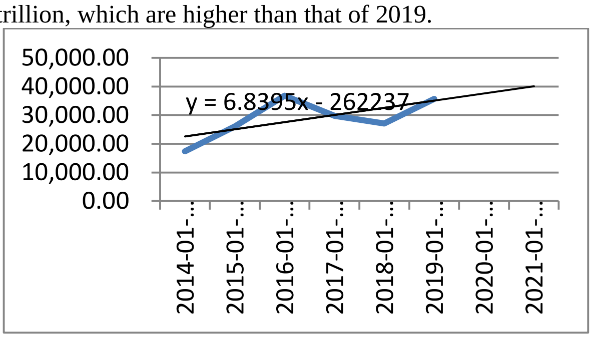

Figure 1 Trend of repayment scale of short-term bonds in 2014-2019

Default situation of credit bond market in 2020:
Under the background that the default scale of credit bonds reached a record high in 2019, affected by the epidemic situation, the default situation of the bond market will be more severe in 2020, and the food and beverage industry or the disaster area of bond default will be severely affected.

2.1.1. The scale of maturity repayment will increase unabated in 2020, and the scale of default will reach a new high

In 2019, there are 73 defaulting entities in the bond market, with the scale of bond default reaching 180.151 billion yuan, a year-on-year increase of 17.42%. The trend of continuous expansion of the scale of credit bond default has not changed. In 2020, it is preliminarily estimated that the maturity and repayment scale of credit bonds will not be reduced, and the impact of 2019 nCov will be superimposed, and the default scale of credit bonds may reach a new record.

We estimate that the expected maturity of credit bonds in 2020 is 12.72 trillion yuan. In 2020, the maturity repayment scale of stock credit bonds excluding short-term bonds is 8.48 trillion, roughly estimated that the repayment scale of credit bonds within one-year period in 2020 is about 4.24 trillion, with a total of 12.72 trillion, which is about 7.43% higher than the total maturity repayment of the whole credit bond market in 2019.

2.1.2. Food and beverage industry or bond default disaster area

From the perspective of the impact path of SARS epidemic on the industry, the negative impact will gradually increase from top to bottom along the industry chain. The impact of cultural media, road transportation, food and beverage, hotel, restaurant and leisure and other terminal services and consumer industries is the largest, and the impact of upstream raw material industry is relatively moderate.
At present, the maturity repayment scale of the stock bonds in the cultural media, road transportation and food and beverage industries is RMB 24.244 billion, RMB 113.271 billion and RMB 50.073 billion respectively. If the short-term bonds issued in 2020 and repaid in that year are added, the maturity repayment scale of the three industries is expected to continue to grow in 2020. The maturity repayment scale of bonds in the hotel, restaurant and leisure industries was 6.483 billion yuan, down sharply from last year.
The food and beverage industry is more likely to be hit by bond default. In the past two years, the scale of bond default in the food and beverage industry has been relatively large. In 2019, the scale of bond default in the industry reached 12.334 billion yuan, which is on the rise year by year. In 2020, affected by the epidemic, the food and beverage industry may become a disaster area of bond default, which needs to be focused on prevention. In the other three industries, although the repayment pressure at maturity is still large, the overall default rate is low, and the possibility of large-scale default in the future is relatively small.

2.1.3. There is no significant increase in the pressure of maturity repayment of Hubei regional credit bonds, but we need to be alert to the continuous impact of the epidemic

From the perspective of stock, the maturity scale of Hubei stock credit bonds in 2020 will be 62.44 billion yuan, of which Wuhan stock credit bonds will be 55.04 billion yuan, basically the same as that in 2019. Even with the newly issued short-term bonds, it is expected that the maturity and repayment pressure will not increase significantly in 2020.
According to the historical default data, the default scale of Hubei's credit bonds in 2019 is only RMB 750 million, significantly lower than RMB 5237 million in 2018. In the

absence of a significant increase in the maturity scale, Hubei default bonds are not expected to default on a large scale in 2020. However, at present, the prospect of epidemic prevention and control in Hubei, especially in Wuhan, is not clear. If production and operation activities cannot be resumed for a long time, relevant enterprises may still default on collective bonds, which should be vigilant.

3. CONCLUSION

In order to reduce the impact of the epidemic on the real economy and prevent the possible market risks, the central bank, the CSRC, the CBRC and the Ministry of Finance and other ministries and commissions have successively introduced measures from the aspects of releasing market liquidity, supporting enterprises to "develop new and return old", increasing credit support and providing differentiated financial services. At the overall level, they have effectively maintained market liquidity and alleviated market risks. In the next step, policies such as precise rescue may be introduced in succession to solve local economic and financial problems more specifically.

For this reason, we can consider two aspects to make corresponding preparations. First, we must pay attention to the operation status and cash flow level of enterprises in industries and regions greatly affected by the epidemic, distinguish the short-term problems caused by the force majeure of the epidemic and the operation problems of enterprises themselves, and provide reference for the follow-up precise rescue policies. Second, when the economy and industry are greatly impacted, they often call for corresponding financial innovation. Zero coupon, preferred stock, high-yield debt and other products are conducive to balancing the term structure of corporate cash flow, and can be ready for promotion.

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