The Implicit Government Guarantee as a Spillover Channel: Evidence from Chinese Local SOE Bond Markets

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Abstract

We demonstrate that the implicit government guarantee (IGG) can produce a spillover effect, transforming an idiosyncratic shock into a systemic shock. A model has been developed to illustrate the mechanism. The pivotal channel is that, when investors are unable to distinguish between an idiosyncratic default and a policy regime shift, they will revise their beliefs regarding the IGG for all default cases. We provide empirical evidence for the model by examining the unforeseen default event of Yongcheng Coal Group in November 2020. This event is regarded as an exogenous shock that eroded investors' confidence in the IGG, particularly that of local governments in precarious financial positions. Employing difference-in-differences regression analysis, we observe a 50-basis-point increase in the credit spread for SOE bonds in a weak financial condition relative to those in a strong financial condition, which represents a significant 30% of the average credit spread. Further analysis indicates that the shifts in IGG-related beliefs prompted by the Yongcheng default are more pronounced for bonds with lower ratings, aligning with our model's predictions. Our results echo the great effort made by the Chinese central government to reduce the IGG provided by local governments.

Keywords: implicit government guarantee, state-owned enterprise, default, corporate bonds, chengtou bonds

JEL classification: G12, G15, G18

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1 Introduction

Researchers have long been interested in the mechanisms by which small, idiosyncratic shocks can precipitate negative spillovers into the broader economy. Numerous channels have been found, including production networks and market concentration (Gabaix (2011); Amiti and Weinstein (2018); Grigoli et al. (2022)), to financial intermediaries (Benmelech and Bergman (2011); Ellul et al. (2021)), to shadow banks (Elkamhi and Nozawa (2022)). In this paper, we emphasize that an idiosyncratic shock can generate a spillover effect as a result of a change in beliefs. In particular, through a change in beliefs in an implicit government guarantee (IGG), a single default event can lead to a systematic shock to the whole bond market. We develop a model to illustrate this new channel and provide empirical evidence of the channel from an asset pricing point of view. In a market where the presence of government support is pervasive, when a default event occurs, it may contain two pieces of information: an idiosyncratic negative shock to this firm or a systematic change in IGG probability. Since investors cannot tell the difference between these two scenarios, they update their posterior belief in an IGG. In this way, an idiosyncratic default event can affect the whole market to a great extent as a result of changes in investors beliefs, which in turn increases market fragility. Moreover, the rise in credit spread will increase the cost of capital and prevent firm investment, thus generating a negative shock to the real economy.

We first construct a model of bailout belief formation to formalize the channel above and integrate it with bond pricing. In the model, the government bailout only if it has the intention (whose probability depends on the policy regime) and the bailout is feasible (whose probability depends on the characteristics of the defaulting firm). When the government does not bailout in a default case, the investor cannot observe the particular reason, and they will adjust their beliefs about the bailout regime which bailout regime they are in. The model yields several testable predictions: when the government does not bailout in a default case, the entire bond market will experience a negative impact due to investors adjusting their perceived bailout probability across all bonds. The model also implies that bonds issued by firms in provinces with weak financial conditions will suffer more, and this effect is particularly strong for bonds with higher default risk (e.g., low-rating bonds and non-Chengtou bonds). Our empirical evidence supports these model implications.

Our paper provides empirical evidence by exploiting the unexpected default event of Yongcheng Coal Group in November 2020, coupled with unique institutional characteristics in the Chinese bond market. Because of the strict approval process for bond issuance in China, a majority of bonds are issued by state-owned enterprises (SOEs). Furthermore, bond investors pay attention not only to the fundamentals of SOEs but also to the government support behind them. If an SOE is backed by the local government, its bonds will be regarded as safe even if the SOE is in a weakened financial condition. This characteristic of the Chinese bond market has been extensively documented in various studies (Geng and Pan (2019); Liu et al. (2017)). However, However, should a bond issued by an SOE default, the strong belief in IGG will suddenly collapse, and the bond market will be seriously affected, even if the default amount is small.

This is what happened in November 2020 when the bond market was shocked by a series of default events. The most important one was the default of Yongcheng Coal Group. We pay attention to this event for two reasons. First, this event was exogenous to investors. The bonds had an AAA rating just before the default, and investors were greatly shocked because they used to believe that the local government would never let the SOE default, since it is one of the biggest SOEs in Henan Province. Second, this event should have been an idiosyncratic shock to an SOE in Henan Province. Although the total default amount was not large, it became a systemic shock that caused widespread panic in the Chinese bond market. The central government even issued an announcement to stabilize the market following the event. Taken together, the Chinese bond market and Yongcheng's default provide an ideal setting to test our model, namely, how an unexpected idiosyncratic default shock can generate a systemic belief change in IGGs, which is captured by the dramatic change in bond prices.

In this paper, we test our model empirically by showing how Yongcheng's default affected the Chinese local SOE bond market. First, we try to calculate the change in bond price before and after the default event. The main empirical method is difference-in-differences. All the corporate bonds issued by a local SOE are divided into a control group and a treatment group. A bond belongs to the treatment group if its issuer is located in a province with a poor financial condition; if not, that bond belongs to the control group. The measures of the local government financial condition are from Liu et al. (2017) and Ang et al. (2018). We employ principal component analysis to compress them into a single measure. The dependent variable is the credit spread. Because of the low liquidity in the Chinese bond market, we use the haircut as another dependent variable, following Chen et al. (2019). The sample period is from October 26 to November 27, 2020. We focus on a short time window because the time-varying firm fundamentals (e.g., profitability) do not change too much. The regression results show that after the default shock, the average spread of the treatment group goes up an additional 49.8 basis points compared with the control group, which is about 25% of the median spread. The average haircut of the treatment group goes up an additional 43.2 basis points compared with the control group. We also find that the effect is stronger in the non-chengtou subsample. All of these empirical results support our model that after the event, investors adjust the bailout belief, which causes a negative price impact for the whole bond market. This echoes the systemic belief change predicted by the model.

Then, we test whether the effect is more pronounced in high-rating bonds or low-rating bonds. Given the minimal variation in credit ratings in the Chinese bond market, we instead utilized the implicit rating. For the high-rating subsample, the default event has no effect. The difference between the treatment group and the control group even slightly decreases during the sample period. In other words, our results are predominantly driven by low-rated bonds, which align with our model's prediction that bonds with a higher default probability will be more affected.

After investigating the pricing effect of the IGG in a short period, the question that naturally follows is whether the effect disappears or persists in the long run. If the short-term effect is mainly from the overreaction of investors, the difference between the treatment group and the control group will converge. In contrast, if the reason for the short-term effect is that the belief in the IGG has been broken after the default event, the difference between the treatment group and the control group will diverge. We repeat the difference-in-differences regressions with a longer sample periodone-half year before and after Yongcheng's default, and the results support the latter hypothesis. The difference in the credit spread between the treatment group and the control group keeps increasing for several months after the default event.

Finally, we conduct a few placebo tests. The first placebo test is to repeat our analysis with the Baoding Tianwei default event.[1] The difference in the credit spread between the treatment group and the control group does not change significantly after this default event. The reason is that Baoding Tianwei is a central SOE instead of a local SOE. Its default will not make the credit spread for local SOEs in different provinces diverge. The second placebo test, motivated by Mo et al. (2021), is to repeat our analysis with the Chaori default event. Here, the difference in the credit spread between the treatment group and the control group does not change significantly after this default event either. However, the average difference between the credit spread of bonds issued by non-SOE and SOE becomes significantly higher, which is consistent with the findings of Mo et al. (2021). The third placebo test is to repeat our analysis around July 27, 2021, when Yongcheng was confirmed to have conducted financial fraud. We do not find any evidence that the average spread of the treatment group goes up compared with the control group, which indicates that the financial fraud is not the reason for the bond market reaction after Yongcheng's default. We also repeat our analysis with a longer sample period, and the result does not change much. All the results above support our main findings: Yongcheng's default was a remarkable event in the Chinese bond markets, and it breaks investors' belief in the IGG on a local SOE to a large extent.

[1]This is the first SOE default event in China. Jin et al. (2020) study the effect of this event. Our paper is different from theirs in two aspects: first, our paper focuses on a local SOE, whereas Baoding Tianwei is a central SOE. Second, our paper studies the change in the financing cost, whereas their paper focuses on the real effect.

Our empirical findings provide several policy implications. Once investors' belief in the IGG is shaken, the cost of debt financing for local SOEs will substantially increase. Our back-of-the-envelope calculation shows that this impact is significant because the shock is persistent. It reduces the market value of bonds issued by local SOEs and local government financing vehicles (LGFVs) in financially weaker provinces by 89 billion RMB. Recognizing the considerable financial risks, the Chinese central government has implemented numerous regulations in recent years to address its local government debt burden. Although one of the central goals of these regulations is to diminish the IGG for local SOEs, our empirical results suggest that the IGG continues to influence the Chinese bond market despite the central government's intensive efforts. We give several suggestions based on our findings, including that local governments should communicate clearly how bailout decisions are made to stabilize investors' beliefs.

Our paper contributes to the literature studying the spillover effect that translates an idiosyncratic shock into a systemic shock. One strand of this literature focuses on the real economy, primarily from the perspective of the real business cycle (Gabaix (2011); Amiti and Weinstein (2018); Grigoli et al. (2022)). This paper is closely related to another strand of literature that examines financial intermediaries and financial markets. Differing from previously documented channels such as investors' uncertainty (Krishnamurthy (2010)), accounting standards (Ellul et al. (2014)), fire sales from banks and shadow banks (Greenwood et al. (2015); Duarte and Eisenbach (2021); Elkamhi and Nozawa (2022)) and guarantees provided by insurance companies (Ellul et al. (2021)), this paper is the first to examine a new spillover channel: through changes in beliefs, a single shock can generate a systemic shock to the entire market. We develop a simple model and provide empirical evidence of this channel. Although we do not directly investigate the effect on the real economy, the rise in the credit spread will increase the cost of capital and could deter firm investment, as suggested by Jin et al. (2020). Our paper also complements the too-big-to-fail literature (Strahan (2013); Gormley et al. (2015); Dávila and Walther (2020)) by showing that in the context of a pervasive belief about government support, such as in China, an idiosyncratic default event may cause systemic financial market fragility as a result of changes in investors' beliefs.

Our paper contributes to the literature that connects beliefs to asset pricing, especially the belief in an IGG. If the government tends to bail out large banks or firms to prevent a financial crisis, investors will form expectations for a government bailout. Kelly et al. (2016) examine the pricing of financial crash insurance with option price data and backward estimate the value of a government bailout in investors' minds. The expectation of a government bailout also matters in the bond market, and there are lots of papers on this topic (Borisova and Megginson (2011); Acharya et al. (2016); Liu et al. (2017); Gao et al. (2019)). By focusing on bonds issued by an SOE, our paper is closely related to Geng and Pan (2019). Geng and Pan (2019) calculate the SOE premium in the bond market for different periods and explain the SOE premium with credit quality and government holdings. They find that after 2018Q2, investors update their perception of what qualifies as government support and begin to differentiate weaker SOEs from stronger ones. However, most of these studies provide only a correlation rather than causal evidence. Using difference-in-differences regressions, our paper finds causal evidence that belief in an IGG has a pricing effect in the Chinese bond market. Moreover, our model illustrates a new mechanism: if all the bonds issued by SOEs share a common exposure to a change in beliefs regarding an IGG, then an idiosyncratic shock can lead to a systemic shock, as investors adjust their beliefs about a government bailout. We document empirical evidence supporting this mechanism.

Our paper also belongs to the expanding literature on the Chinese local government debt issue. Some researchers investigate the reasons for local governments' heavy debt burden, such as the hangover effect of the 4 trillion yuan stimulus package (Chen et al. (2020)), the GDP tournament among local governments (Qu et al. (2019); Song and Xiong (2018)), and short-termism of local government officials (Xiong (2018)). Other researchers focus on the negative impact of local government debt, such as crowding out the investment of private firms (Huang et al. (2020)) and selectively defaulting when they can identify creditors (Gao et al. (2021)). Our paper contributes to this strand of literature by showing that implicit local government debt–that is, local SOE bonds enjoying an IGGcan amplify shocks[2] to Chinese local governments, increasing their fragility. Our paper also justifies the ongoing attempt of the central government to reduce the IGG.

Our paper is part of the literature on the Chinese bond market. As China has become the world's second-largest economy, an increasing number of researchers are turning their attention to the Chinese bond market (Ang et al. (2018); Livingston et al. (2018); Chen et al. (2019); Liu et al. (2019); Ding et al. (2022)). Our paper is particularly related to the literature investigating the impact of default events on bond pricing. Mo et al. (2021) study the first bond default in China, Chaori's default. They document significant bond yield increases after the default event, especially for low-rating bonds. Jin et al. (2020) investigate the broader economic implications of the first large state-owned enterprise (SOE) default in 2015, while Dong et al. (2021) analyze the influence of implicit government guarantees on credit ratings in the context of this landmark SOE default. Our research builds upon these works by leveraging the default of Yongcheng Coal Group to be the first to identify and quantify the implicit government guarantee's effect on bond pricing in China.

The rest of the paper is organized as follows. Section 2 gives the brief overview of Chinese credit market and the Chinese local government debt issue and introduces the background of the default events. Section 3 summarizes the data used in this paper. Section 4 calculates the pricing effect of the implicit government guarantee and shows our main result. Section 5 conducts a few placebo tests. Section 6 discusses the policy implications. Finally, Section 7 concludes.

[2]Here, we refer to both fundamental shocks and financial shocks, which tighten the budget constraint of local governments.

2 Background Information

2.1 Overview of the Chinese Bond Market

Over the past decade, Chinese bond markets have grown rapidly to 133.5 trillion RMB in 2021 and are now the second largest in the world, after the United States ($57 trillion). This market has three types of credit instruments: government bonds, financial bonds, and corporate bonds. Corporate bonds, which make up the largest proportion of bonds, are the main focus of this paper. A special type of bond in the Chinese bond market is called the chengtou bond, or urban construction and investment bonds, which we will present in detail in the next section.

The Chinese bond market is characterized by some unique features. First, the liquidity of the Chinese bond market is low. In our data, over 95% of daily bond observations have no transaction. The reason for this absence is that the biggest participants in the Chinese bond market are commercial banks, who usually hold the bonds to maturity without trading. Second, the rating is extremely high. According to Amstad and He (2020), over 50% of bonds are rated AAA or above. In the meantime, default rarely happens. Third, over 80% bonds are issued by SOEs since bond issuance is strictly regulated. After the SOE was restructured by the "Grasp the Large, Let Go of the Small" reform in the 1990s, current SOEs are usually large scaled, group oriented, and capitalized. They are deeply connected with local governments, which leads to a special bond market characteristic, the IGG belief.

The effect of an implicit government guarantee is great in China. Since a huge amount of bonds are issued by large SOEs, bond investors pay attention not only to the fundamentals of a firm but also to the government support behind it. If an SOE is endorsed by the local government, its bonds will be regarded as safe even if the SOE is in a weak financial condition, as well documented in the literature (Liu et al. (2017); Geng and Pan (2019); Dong et al. (2021)). For example, Zhang et al. (2022) estimate the value of the IGG by comparing the yields on SOE bonds and non-SOE bonds and find that the value of implicit government guarantees is larger for low rating bonds. However, it is hard to measure the implicit government guarantee empirically. Faccio et al. (2006) measure implicit government guarantee with political connections. Kelly et al. (2016) calculate the value of an implicit government guarantee with option price data. Geng and Pan (2019) focus on the pricing effect of an SOE label and government holdings. Following Liu et al. (2017), we assume that the financial condition of the local government will affect the implicit government guarantee of the local SOE in that region.

2.2 Local SOE, LGFV, and Implicit Debts of Local Governments

The 1994 tax sharing reform is the cause of the implicit debts of local governments. On the one hand, a large portion of local government tax revenue is handed over to the central government after the reform. On the other hand, local governments are responsible for building infrastructure and promoting economic growth, which requires substantial financial support. This leads to a gradual imbalance between local government revenues and expenditures, and the 1994 Budget Law has limited the ability of local governments to raise funds through the issuance of local bonds.[3] As a result, local governments have had to rely on LGFVs to obtain funds to support infrastructure investment. The bonds issued by LGFVs are also referred to as chengtou bonds. Compared with other local SOEs, LGFVs have even closer relationships to local government and enjoy a higher level of an implicit government guarantee, since their purpose is to provide financing for public goods, although the central government forbids the local government from providing a guarantee with its own budget. [4]. As stated in Chen et al. (2020), it is the outcome of the mixture of planning and the market in today's Chinese economy.

The "four trillion" policy launched in 2009 is another important reason for the increase

[3]To improve the transparency of local government debt, in 2014 Chinese authorities approved municipal bonds as the official financing channel for local governments. This reform was termed "opening the front door and blocking the side door." However, since the issuance of municipal bonds is subject to strict regulations, local governments continue to rely heavily on LGFVs to raise funds.

[4]http://www.gov.cn/zwgk/2010-06/13/content_1627195.htm

in the implicit debts of local governments. The global subprime crisis in 2008 had a negative impact on the Chinese economy. China intended to overcome the crisis with counter-cyclical investment through the "four trillion stimulus package." This stimulus program was implemented by the local government through an off-balance sheet business through an LGFV. According to Chen et al. (2020) and Bai et al. (2021), Beijing reverted its aggressive credit policy back to normal in 2010, but these 2009 stimulus loans were left on LGFVs' balance sheets and became a major liability implicitly assumed by Chinese local governments. At the same time, they find empirical evidence of a stimulus loan hangover effect: provinces with more stimulus bank loans in 2009 have more issuances of chengtou bonds several years later. These loans gradually became a burden for local governments.

In addition, the high debt burden of local SOEs is an integral part of the implicit debt of local governments. Local SOEs played an important role in economic development and infrastructure construction during the process of China's urbanization. In recent years, however, local SOEs, especially those in less developed provinces, have not performed well. According to Huang et al. (2020) , compared with private firms, local SOEs are less efficient, less profitable and less able to pay off their debts. In addition, defaults by local SOEs will have a harmful impact on the local economy and unemployment rate, which in turn affects the promotion of officials. As a result, local governments tend to provide guarantees and bailouts for local SOEs that are about to default. Thus, the debts of local SOEs also become the government's implicit debts.

Regional GDP competition further exacerbates the problem. Debt gives a local government official a greater capacity to invest in infrastructure and thus may intensify his short-termism behavior induced by promotion. Qu et al. (2019) provide empirical evidence that when a local government's GDP growth falls behind its competitors, it tends to issue debt more aggressively.

The rapid increase in the implicit debts of local governments has become a threat to the health of China's financial system. Starting in 2014, China's central government has attempted to make part of the implicit debt visible. The *2014 Circular 43* was issued to regulate the conduct of financing platforms.[5] The *2017 Circular 50* draws a clear dividing line between financing platform debt and local government debt, stipulating that debts borrowed by local government financing platforms after January 1, 2015, are not recognized as local government debts.[6] This circular also prohibits local governments from providing guarantees for financing platforms. The *2019 Circular 40* (not publicly available) dealt with the stock of LGFV debts by means of debt swaps and so on and promoted negotiations among relevant parties, in order to solve this problem.[7] The *2021 Circular 15* reiterated China central government's attitude to "break the illusion of bailout".[8] Although China's central government has been exerting extensive efforts to reduce implicit local government guarantees, these efforts have not eliminated investors' belief that local SOE debts are still under the endorsement of implicit government guarantees, as they insisted that, if such financing platform defaults occur, the negative impacts would pass through to the local economy and damage the reputations of local government officials.

2.3 The Default Event

Investors often believe that bonds issued by SOEs enjoy implicit government guarantees. However, this assumption was broken when default events happened one after another in November 2020 in the Chinese bond market,[9] especially in the case of Yongcheng Coal Group.[10] Table 1 summarizes the timeline of these default events.

[5]The title is "Opinions of the State Council on strengthening the management of local government debt", issued by the State Council. http://www.gov.cn/zhengce/content/2014-10/02/content_9111.htm.

[6]The title is "Notice on further regulating the debt financing behavior of local governments", issued by the Ministry of Finance. http://www.gov.cn/xinwen/2017-05/03/content_5190675.htm

[7]The title is "Opinions on preventing and resolving the risk of maturity stock of local government implicit debt of financing platform companies."

[8]The title is "Guidance for banks and insurance institutions to further prevent and resolve the risk of implicit debt of local governments", issued by China Banking and Insurance Regulatory Commission. http://www.shysrzzl.com/page107?article_id=202

[9]There are some other default cases near Yongmei's default, such as Brilliance Auto Group and Tsinghua Unigroup. We exclude their bonds in our sample.

[10]News report about these defaults can be found in
https://www.wsj.com/articles/china-vows-to-investigate-bond-market-misconduct-11606126445?page=1
https://www.wsj.com/articles/regulatory-pressure-mounts-on-coal-miner-that-rattled-chinas-bond-market-

Yongcheng Coal Group, owned by Henan SASAC, is one of the most important industrial enterprises in Henan Province. Its primary business is in the coal industry. On February 12, 2020, Yongcheng Coal Group issued bond "20SCP003", with a 4.39% coupon rate and a 270-day term. The bond, valued at 1 billion RMB in total, ended up defaulting on November 10, 2020. After eight months, on July 27, 2021, the China Securities Regulatory Commission confirmed that Yongcheng had conducted financial fraud, and the executives of Yongcheng were punished.

We focus on Yongcheng Coal Group's default for several reasons.[11] First, the coal industry is in good financial condition. The coal price index rises from around 130 in 2016 to 150 after 2019. Second, Yongcheng's financial condition appears to be healthy. Its 2020Q3 financial report shows that the company has more than 47 billion yuan in cash. Therefore, it is a great surprise to everyone when it becomes unable to pay back its debt of 1 billion yuan. Third, Yongcheng is one of the biggest SOEs in Henan Province. Investors tend to think that the government will never let an SOE go bankrupt. Additionally, the bond has an AAA rating just before the default event. Based on these three reasons, investors' expectation is that Yongcheng is very unlikely to default, which is why the default event causes great panic in the Chinese bond market. This default event also indicates that the Chinese government decides to pursue its gradual no-bailout reform and break the belief of rigid repayment, just as in the recent Evergrande case.[12]

Figure 1 shows the overall pattern of China's bond market around the Yongcheng default event. The credit bond's price drops a lot after the default event. The price of chengtou

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https://www.economist.com/finance-and-economics/2020/11/19/chinas-bond-market-is-jolted-by-some-surprising-defaults

[11]We will illustrate Yongcheng's default from a model perspective in Section 3.4.

[12]The case of Evergrande is different from Yongcheng Coal Group in two ways. First, Evergrande is not an SOE, despite its large size. Its default is likely to be an isolated event and is less likely to spread to other firms. However, the default of Yongcheng Coal Group breaks investors' belief in local SOEs, thus generating a significant impact on the Chinese bond market. Second, the default risk of Evergrande had been well-known to the public for a long time, and its bond prices gradually decreased throughout 2021. In contrast, investors believed Yongcheng Coal Group was in good financial condition just before its default, and this explains why the default event deeply shocked them. Based on these two reasons, we suggest that the default of Yongcheng Coal Group is more influential than the case of Evergrande.

bonds drops as well, but slightly less than the price of credit bonds. The price of short-term treasury bonds also drops a little bit. This shock is so great that 143 bond issuances, valued at over 110 billion yuan, are delayed or canceled within one month after the default event, compared with 57.1 billion yuan in October and 33.2 billion yuan in September. Most of them are issued by SOEs owned by the local government. On November 21, in order to stabilize the market, the central government declares it will show zero tolerance for misconduct in the debt markets.

3 Model

3.1 Investors' belief for bailout policy

In this section, we build a belief formation model to motivate our empirical test on the Yongcheng default event. The model demonstrates how an idiosyncratic default event can generate a systemic shock in the bond market. The basic intuition is that a default event communicates two pieces of information: an idiosyncratic negative shock to the firm or a systemic change in bailout probability. Since investors cannot distinguish between these two scenarios, they adjust their belief, which affects the entire bond market.

In our model, there are two regimes for government bailout policy. The government can bailout with a probability π^H or π^L. H and L denote two state. Investors know the value of π^H and π^L, but they cannot observe which bailout regime we are in directly.[13]

$$\pi = \begin{cases} \pi^H \\ \pi^L \quad where \quad \pi^H > \pi^L \end{cases}$$

Without loss of generality, we assume one default case at each time point t.[14] For each

[13]In reality, this setup corresponds to the government's attitude toward bailout. For example, the 2021 Circular 15 reiterated the China central government's attitude to "break the illusion of the bailout". Then, it is possible that the government may move from π^H to π^L after this announcement.

[14]We assume one default case because time can be viewed as continuous. Even if there are multiple default

default case, there are two potential outcomes: bailout or bankrupt, depending on the action of government. We use I_t^i to denote the results: $I_t^i = 1$ means the government provides a **bailout**, while $I_t^i = 0$ means the government does not bailout and the firm goes bankrupt.

Furthermore, we assume that whether the government bailouts or not depends on two factors. The first one is the government's intention to bailout, denoted by I_t^{policy}. $I_t^{policy} = 1$ means government is willing to bailout, while $I_t^{policy} = 0$ is unwilling to bailout. The probability of $I_t^{policy} = 1$ equals to π_H or π_L, depending on which bailout regime we are in. The second one is the feasibility(?) of the bailout, denoted by $I_{\epsilon_t}^i$. $I_{\epsilon_t}^i = 1$ means the firm can be bailouted while $I_{\epsilon_t}^i = 0$ means the default is so serious that the firm cannot be bailouted. The probability of $I_{\epsilon_t}^i = 1$ is equal to $\pi_{\epsilon_t}^i$, which varies based on the characteristic of firm i[15]. We assume $\pi_{\epsilon_t}^i$ is public knowledge for all the investors.[16] In other words, we decompose the determinant of the bailout outcome into two parts: government level factors (captured by I_t^{policy}) and firm level factors (captured by $I_{\epsilon_t}^i$).

We assume a simple formula:

$$I_t^i = I_t^{policy} \times I_{\epsilon_t}^i \tag{1}$$

where I_t^{policy} and $I_{\epsilon_t}^i$ cannot be directly observed by investors. Only the outcome I_t^i is observable. Our assumption is that the government will bailout only if the government has an intention to bailout, and in the same time, the bailout is feasiable.[17]

cases in a particular year, these cases still come sequentially.

[15]For example, $\pi_{\epsilon_t}^i$ will be relatively high if the defaulting firm is an LGFV, which is deeply connected with the local government. Conversely, if the default's magnitude is so large that the government does not have the ability to bailout, then $I_{\epsilon_t}^i = 0$.

[16]We use the subscript t_i for I_t^i and $I_{\epsilon_t}^i$ because we want to emphasize that I_t^i and $I_{\epsilon_t}^i$ are idiosyncratic, while I_t^{policy} is systematic. In fact, t and i have a one-to-one mapping in our model since there is only one default case at each time t.

[17]We provide two examples to illustrate this setting. First, Baoshang Bank went bankrupt in 2020. The government did not provide a full guarantee for everyone, and some creditors bore part of the losses. The reason why the government did not bailout might be to punish the misconduct of the Mingtian Group. This is an example of $I_t^{policy} = 0$ and I_{ϵ_t}=1. Second, Evergrande defaulted several times in 2023, though it has not gone bankrupt. Even if its debt problems and unfinished real estate projects have had a huge influence on the economy, the government cannot solve the problem with a full bailout, since the amount is so large. This is an example of $I_t^{policy} = 1$ and $I_{\epsilon_t} = 0$. In some cases, these two aspects cannot be easily separated."

Investors cannot observe I_t^{policy} and $I_{\epsilon_t}^i$. They form belief to update the probability of regime $Prob[\pi = \pi^H | I_1, I_2, ..., I_t]$ based on the information set $\{I_t\}$. For simplicity, we will use the notation $\hat{p}_t^H$ to denote the belief of the probability of regime H based on observing the information set up to t. By definition, the belief of the probability of regime L equals to $1 - \hat{p}_t^H$. The belief is updated following Bayesian learning process. If the firm is bailouted at time t, investors will adjust their belief in the following way:

$$\hat{p}_t^H | \{I_t = 1\} = \frac{prob(bailout|H) \times prob(H|\{I_{t-1}\})}{prob(bailout)} = \frac{\pi^H \times \pi_{\epsilon_t}^i \times \hat{p}_{t-1}^H}{\pi^H \times \pi_{\epsilon_t}^i \times \hat{p}_{t-1}^H + \pi^L \times \pi_{\epsilon_t}^i \times (1 - \hat{p}_{t-1}^H)} \quad (2)$$

Here, we assume $\hat{p}_0^H$ is investors' prior for state H at $t = 0$, which is a constant. Since $\pi^H > \pi^L$, if the firm is bailouted, then $\hat{p}_t^H > \hat{p}_{t-1}^H$, which is consistant with our intuition. Another implication is that the change in belief is unrelated to the shock to firm $\pi_{\epsilon_t}^i$ in this case.

If the firm is not bailouted, investors will adjust their belief in the following way:

$$\hat{p}_t^H | \{I_t = 0\} = \frac{prob(bankrupt|H) \times prob(H|I_{t-1})}{prob(bankrupt)} \quad (3)$$

$$= \frac{(1 - \pi^H \times \pi_{\epsilon_t}) \times \hat{p}_{t-1}^H}{(1 - \pi^H \times \pi_{\epsilon_t}) \times \hat{p}_{t-1}^H + (1 - \pi^L \times \pi_{\epsilon_t}) \times (1 - \hat{p}_{t-1}^H)} \quad (4)$$

The belief updating process in no bailout case is more complex. To illustrate the equation above, we provide two special cases. In the first case, $\pi_{\epsilon_t}^i = 0$, which means that this company is too problematic to be saved.[18] Then, we have

$$\hat{p}_t^H | \{I_t = 0\} = \frac{\hat{p}_{t-1}^H}{\hat{p}_{t-1}^H + (1 - \hat{p}_{t-1}^H)} = \hat{p}_{t-1}^H \quad (5)$$

It means that the default case will provide no information for the bailout policy regime. In the second case, $\pi_{\epsilon_t}^i = 1$, which means the firm can easily be saved and the result only

[18] To some extent, it can also be illustrated that the government will never bailout such a firm ex-ante (POE rather than SOE).

depends on the outcome of the government bailout policy. Then, we have

$$\hat{p}_t^H|\{I_t = 0\} = \frac{(1-\pi^H) \times \hat{p}_{t-1}^H}{(1-\pi^H) \times \hat{p}_{t-1}^H + (1-\pi^L) \times (1-\hat{p}_{t-1}^H)} \tag{6}$$

Since $\pi_H > \pi_L$ and $\hat{p}_{t-1}^H$ is between 0 and 1, we have $\hat{p}_t^H < \hat{p}_{t-1}^H$. $\hat{p}_t^H$ is monotonic decreasing with $\pi_{\epsilon_t}^i$. Therefore, $\pi_{\epsilon_t}^i$ captures the information ratio of the default case. If the government does not bailout, the higher $\pi_{\epsilon_t}^i$ is, the larger the belief adjustment is.

In the case of Yongcheng's default, which we discussed in the previous section, Yongcheng's financial condition appeared healthy. Moreover, due to Yongcheng's size, investors believed government was very likely to bailout. The default bond was valued at 1 billion RMB in total. Unlike Evergrande's case, this amount was not so large as to exceed the government's ability to intervene. Furthermore, as Yongcheng is one of the largest SOEs in Henan province, the government has substantial incentive to provide a bailout. Consequently, Yongcheng's default case had a significant information ratio π_{ϵ_t}, leading to a substantial impact on investors' beliefs.

The expected bailout probability is denoted as $\hat{\pi}_t$. It captures the belief of bailout by investors. We define the bailout belief adjustment as the difference between the expected bailout probability before and after a specific event, denoted as $\Delta\hat{\pi}_t$. We take absolute value because we want to compare the downward belief adjustment for strong province and weak province when no bailout occurs.

$$\hat{\pi}_t = \hat{p}_t^H \pi_H + (1-\hat{p}_t^H)\pi_L \tag{7}$$

$$\Delta\hat{\pi}_t = |\hat{\pi}_t - \hat{\pi}_{t-1}| \tag{8}$$

$$= |(\hat{p}_t^H \pi_H + (1-\hat{p}_t^H)\pi_L) - (\hat{p}_{t-1}^H \pi_H + (1-\hat{p}_{t-1}^H)\pi_L)| \tag{9}$$

$$= |\hat{p}_t^H - \hat{p}_{t-1}^H|(\pi_H - \pi_L) \tag{10}$$

3.2 Strong versus weak province

Now, we differentiate provinces with strong versus weak financial conditions. In state H, the bailout probability for strong province and weak province are the same. In state L, a strong province has a higher bailout probability. The economic intuition behind this assumption is that the bailout probability is low only if the bailout policy is in low state and the local government lacks funds.[19]

$$\pi^{Weak} = \begin{cases} \pi^H \\ \pi^{Lweak} \quad \text{where} \quad \pi^H > \pi^L \end{cases} \qquad \pi^{Strong} = \begin{cases} \pi^H \\ \pi^{Lstrong} \quad \text{where} \quad \pi^{Lstrong} > \pi^{Lweak} \end{cases}$$

Combined with our definition for bailout belief adjustment, we can prove the following proposition.

Proposition 1. *When there is a default case, the bailout belief adjustment is larger for weak province.*

3.3 Bond pricing

In Merton's model, the value of firm V_t follows a geometric Brownian motion under the risk-neutral measure:

$$\frac{dV_t}{V_t} = (r - \delta)dt + \sigma dZ_t \tag{11}$$

The bond price B_t can be calculated by:

$$B_t = Ke^{-r(T-t)} - e^{-r(T-t)} E_t^Q[max(K - V_T, 0)] \tag{12}$$

[19]As we mentioned in Section 2, there are only a small number of SOE default cases in China, especially for SOEs in provinces with strong financial conditions. Therefore, we assume that the bailout probability for SOEs in provinces with strong finances is relatively high in both the H and L states.

Consider the bailout probability under risk-neutral measure $\hat{\pi}_t^q$. It equals to the bailout probability under p-measure adjusted by the stochastic discount factor M_t:

$$\hat{\pi}_t^q = \frac{\hat{\pi}_t}{M_t} \tag{13}$$

For simplicity, we assume that M_t is not affected by the bailout probability. We also assume that bond investors can get all the payment if government bailouts, then the bond price becomes:

$$B_t = Ke^{-r(T-t)} - (1 - \hat{\pi}_t^q)e^{-r(T-t)} E_t^Q[max(K - V_T, 0)] \tag{14}$$

If we assume that the default probability and the bailout probability are independent (i.e. $\hat{\pi}_t^q$ does not affect the red part), changing in bond price is linear to $\hat{\pi}_t^q$ and $\hat{\pi}_t$. In other word, when the red part is larger, changing in bailout probability will lead to a larger changing in bond price. Thus, we have the following proposition.

Proposition 2. *When the bailout prabability changes, bonds with higher default probability will be affected to a larger extend.*

3.4 Discussions and Model Implications

Now that we develop a model, we can interpret the Yongcheng's default event from a model perspective. Investors form belief on which policy regime they are in through learning from the default cases. When Yongcheng defaults unexpectedly, investors suddenly realize that the government determines to break the IGG, even if this might be only an idiosyncratic event. In addition, this default event has a high information ratio, which makes the impact even larger. Since the belief term enters into the bond pricing formula for all bonds with IGG, Yongcheng's default can generate a systematic negative price impact in the bond market.

One key assumption in the model is that the investor cannot observe I_t^{policy} and $I_{\epsilon_t}^i$. If investor can observe these two dummy variables separately, they will know the attitude of the government in each case. Then, only the precise signal of policy regime change will affect the bond market rather than all the default events.

The model developed in the previous subsections has several implications. The first one focuses on the different effect on different provinces, which is derived from the Proposition 1. The second and third one focus on the heterogeneity effect on bond rating and Chengtou versus non-Chengtou bond, which is derived from the Proposition 2. We will empirically test these assumptions in the following sections.

Implication 1. *Yongcheng's default event will increase the credit spread for the whole bond market. Bonds issued by SOEs in provinces with weak financial conditions will be more affected.*

Implication 2. *The impact described above will be more pronounced for non-Chengtou bonds than for Chengtou bonds.*

Implication 3. *The impact will be more significant for low-rated bonds than for high-rated bonds.*

4 Data

4.1 Bond data

As mentioned in Section 2.1, the Chinese bond market has three types of credit instruments: government bonds, financial bonds, and corporate bonds.[20] In this paper, we focus on corporate bonds, which can be further divided into two categories: corporate bonds and enterprise bonds. Bond data used in the paper are from the China Stock Market & Accounting Research Database (CSMAR), which provides information on Chinese financial markets. We use the label provided by the Wind Economic Database to identify chengtou bonds. Our analysis

[20] Following Amstad and He (2020), we classify all bonds issued by financial institutions, including commercial banks, insurance companies, and securities firms, as "financial bonds."

focuses on two sample periods: a one-month event window from October 26 to November 27, 2020 on a daily basis and a one-year time window from May 11, 2020, to May 10, 2021, on a weekly basis. Both windows center on the default event. Firm-level variables, such as the leverage ratio and return on equity (ROE), are obtained from the Wind Economic Database as well.

We then conduct the following filtering steps. We exclude PR bonds [21] and bonds with maturity less than six months because their credit spread is too noisy. We exclude bonds issued by non-SOE firms. Bonds with no transaction record after the default event and bonds issued after the default event are also dropped. Since the Chinese bond market has relatively low liquidity, over 95% of the daily observations in our sample have no transaction. Therefore, more than one-half of the bonds are excluded in this step. We cannot adopt a stricter rule or our sample size will be too small. We further delete the bonds issued by firms located in Hong Kong. After that, our sample contains 2,689 bonds. To deal with potential influences caused by outliers, we winsorize continuous variables at the 1% and 99% levels, respectively.

For each bond transaction at day t, we observe its close price, yield to maturity, and trading volume. The credit spread is calculated with yield to maturity by subtracting the corresponding risk-free rate. Similar to other literature, the risk-free rate is measured by China Development Bank bond (CDB) yields. Because the variation in the credit rating is too low in the Chinese bond market, we use the implicit rating instead. The implicit rating, issued by China Bond Financial Valuation Center Co., Ltd., reflects the opinion of investors on bonds dynamically, based on the market price of bonds and the public information of bond issuers. Recently, it has received more and more attention. For most bonds, implicit ratings are lower than credit ratings. Finally, we get 22,238 daily observations in the short time window and 48,742 weekly observations in the long time window.

[21] PR bonds refer to bonds with a prepayment clause. Sometimes the market price of a bond can be far below its face value. In Section 5.1, we find that including or excluding PR bonds can seriously affect the results in the Baoding Tianwei case.

Table 2 reports the summary statistics of our data. We convert the letter grades into numerical grades by assigning 1 to AAA, 2 to AA+, 3 to AA, 4 to AA-, and so on. The median implicit ratings of the bonds are AA. The table shows that 13 percent of the bonds are issued by listed firms and 79 percent by SOEs. The average maturity is 3.26 years. One important characteristic of the Chinese bond market is low liquidity. In our bond sample, nearly 95 percent of the day has no transaction. These results are similar to Geng and Pan (2019).

Because of the illiquid trading of China's corporate bond market, there is a significant amount of sample attrition within a short event window. To mitigate this concern, we rely on another alternative measure of the bond price. China Securities Depository and Clearing Corporation (CSDC), an entity that provides depository and settlement services for the exchange market, announces the conversion rate on a daily basis. The conversion rate is the borrowed amount divided by the face value of the bond in the repos market. For example, suppose a government bond receives a conversion rate of 1, while that of an AAA corporate bond is 0.95. Then, an investor can post one unit of each of the two types of bonds as collateral and borrow 195 yuan from the exchange. Therefore, the conversion rate can serve as a proxy for the bond value. Since a part of the conversion rate is settled by officials instead of based on the market transaction, it has a higher time-series variation. For example, CSDC reduces the conversion rate of Evergrande's bonds to less than 30% at the end of August, even if there are few transaction records during that period. We obtain the daily conversion rate from the website of CSDC. [22] Based on the conversion rate, we calculate the haircut as follows:

$$Haircut = 1 - Conversion\_rate \tag{15}$$

The mean and median of the haircut are 0.14 and 0.10 in our sample. We only use the alternative proxy of the haircut in a short time window when the sample attrition issue is more severe because of the lack of transaction records. Further details of this variable can

[22] http://www.chinaclear.cn/zdjs/xbzzsl/center_flist.shtml

be found in Chen et al. (2019).

4.2 Local Government

Information on the financial conditions of the local governments is obtained from the National Bureau of Statistics[23] and the Ministry of Finance.[24] We use the data between 2017 and 2019 to ensure a clean analysis. Since the ranking of financial conditions of local governments is relatively stable over the past years, the result won't be affected if data from years other than 2017 to 2019 are used. We borrow four variables to measure the financial conditions of the local governments from Liu et al. (2017) and Ang et al. (2018). The first and the second variables are the debt ratio of a province, which is calculated by its annual revenue (or GDP) divided by the total local government debt. The third one measures the importance of a province in the government hierarchy by dividing its GDP by the total GDP. Lastly, we calculate the ratio of a province's general annual revenue to its expenditure. For all these variables, a high ratio implies that the financial condition of a local government is healthy.

After we take the average of these variables across time, we employ principal component analysis (PCA) to compress four measures of the financial conditions of the local governments into one measure. Then, we rank the provinces by that measure and define the bottom one-third as provinces in a weak financial condition. Table 3 summarizes the financial conditions of local governments. The difference between the financial conditions of economically strong provinces and weak provinces is relatively large. The total debt amounts in strong provinces are 600 billion RMB on average, similar to that in weak provinces, which are 607 billion RMB on average. However, GDP and government annual revenue in weak provinces are only 2,037 and 187 billion RMB, much less than that in strong provinces (3,427 and 381 billion RMB). Thus, the government leverage ratio in financially weak provinces is doubled, consistent with the well-known fact that underdeveloped provinces suffer a heavier debt burden.[25] Figure

[23]Data source: https://data.stats.gov.cn/index.htm.

[24]Data source: http://yss.mof.gov.cn/zhuantilanmu/dfzgl/sjtj/

[25]For example, in December 2021, Hegang City in Heilongjiang Province announced financial restructuring

2 plots geographical distribution of provinces with strong versus weak financial conditions. Most strong provinces are located in the coastal area of eastern China, while most weak provinces are concentrated in the southwest and northeast. All the variable in this section are defined in appendix.

5 Empirical Analysis

5.1 Baseline Results of Difference-in-Differences Regressions

In this subsection, we test **Implication 1** and **Implication 2** in Section 3.4. We rely on a difference-in-differences estimation. Our assumption is that Yongcheng's defaults serve as an exogenous shock to investors' belief in the government's policy of providing an IGG for local SOEs, and the change in belief is different between local governments in a strong financial condition and those in a weak financial condition. The belief in IGG among local governments with a weak financial condition is more seriously shaken, an assumption consistent with Geng and Pan (2019)[26]. The event window is one month, from October 26 to November 27, 2020. The short time window difference-in-differences regressions provide a clean estimation because the time-varying firm fundamentals (e.g., profitability) do not change too much.

All the bonds are divided into a treatment group and a control group with the following standard. If an SOE is located in a province where the financial condition of the local government is strong, then the shock is not expected to cause a significant change in beliefs in such bond, and this firm belongs to the control group. In other words, a firm belongs to the treatment group only if it is located in a province with a weak financial condition. The standard of a weak and strong financial condition is discussed in Section 3.2. Since the default event takes place in Henan Province, firms in Henan are also classified as being in

and was the first city to conduct financial restructuring in China.

[26] Geng and Pan (2019) suggest that investors treat SOEs in different provinces differently. "This very fact that, post 2018Q2, investors started to differentiate the extent of government support above and beyond the SOE label is an indication that the unquestionable faith in the SOE label was dissipating. Indeed, as recent as November 12, 2020, China began to see a new wave of defaults by local-government SOEs."

the treatment group.[27] Among the 2,689 bonds in our sample, 476 belong to the treatment group and the remaining bonds belong to the control group.

Before presenting the regression results, we first plot the data to examine whether there are visual changes in the average credit spread corresponding to the default event. Figure 3 shows the plots of the value-weighted average annualized credit spread of the treatment group and control group from October 26 to November 27, 2020.[28] We adjust the red line to make these two lines intersect on November 10, 2020, because the level of the two groups has a difference of about 1%, which would make the results less clear. Our estimates could be biased if the difference between the average credit spread would have diverged in the treatment group versus control group in the absence of the default event. We test this concern by observing the trend before the default event. Figure 3 shows that there is no obvious trend difference between the treatment group and control group before the default event, suggesting that the parallel trend assumption is satisfied in our setting. However, there is a sharp increase in the difference after the default event. Two weeks after the default event, the difference in the average credit spread of the treatment group and control group goes up by 0.8%, indicating that the default event has a large negative impact on all bonds issued by local SOEs in the weak provinces. The average credit spread in the control group also goes up by 0.1%, indicating that even bonds issued by local SOEs in financially strong provinces are slightly affected. The middle panel plots the chengtou bond subsample. The right panel plots the non-chengtou bond subsample. The difference in the average credit spread of the treatment group and control group goes up by 0.6% in the chengtou subsample, while the number is 1.5% in the non-chengtou subsample. The increase in the difference between the control group and the treatment group mainly comes from non-chengtou bonds. Figure 4 plots the value-weighted average haircut of the treatment group and the control group.[29]

[27] The provinces in the treatment groups are: Henan, Hunan, Shaanxi, Liaoning, Guangxi, Yunnan, Heilongjiang, Inner Mongolia, Guizhou, Ningxia and Qinghai.

[28] In this paper, we utilize value-weighted regressions based on bond issuance amounts. We have also conducted equal-weighted regressions, yielding similar results (not reported).

[29] Part of the results come from local SOEs in Henan Province, especially Pingdingshan Coal Group, which is another big SOE in Henan Province in the coal industry.

We also adjust the level in these figures. The pattern of the haircut before and after the default event is similar to that of the credit spread. Two weeks after the default event, the difference in the average credit spread of the treatment group and control group goes up by 0.5%, mainly coming from the non-chengtou subsample as well.

Table 4 shows the results of the value-weighted difference-in-differences regressions with fixed effects:

$$Y_{i,t} = \alpha + \gamma_i + \delta_t + \beta_3(Event_t \times Treatment_i) + u_{i,t} \tag{16}$$

where i denotes a bond, t denotes a trading day, and $Y_{i,t}$ is the outcome variables (i.e. credit spread and haircut). $Treatment_i$ is a dummy variable equal to 1 if a bond is in treatment group discussed above. $Event_t$ is a dummy variable equal to 1 if a day is after the default event. γ_i is the firm fixed effect, and δ_t is the time fixed effect. β_3, the difference-in-difference estimate, captures the differential effect of the default event on bonds issued by a local SOE in a province in poor financial condition relative to bonds issued by a local SOE in a province in a strong financial condition. We cluster the standard errors at the firm level.

The baseline regression results are presented in Table 4. As reported in columns (1) and (2), the coefficients of interaction terms are 0.498 and 0.432 percent after the controlling fixed effect. After the default shock, the average spread of the treatment group goes up an additional 49.8 basis points compared with the control group, which is about 25% of the average spread, indicating that the result is economically significant. The average haircut of the treatment group goes up an additional 43.2 basis points compared with the control group. In columns (3)–(6), we show our regression results in the chengtou and non-chengtou subsamples. Consistent with Figures 3 and 4, the effect is stronger in the non-chengtou subsample. The average credit spread of the treatment group goes up an additional 140.9 basis points compared with the control group because chengtou bonds enjoy a high level of implicit government guarantee from the investors' perspective, consistent with Geng and

Pan (2019).[30] Thus, the belief in chengtou bonds remains even after the default, although Yongcheng Coal Group may share some characteristics of chengtou bonds. However, the statistical significance is low in the non-chengtou subsample because the sample size is too small, which leads to a higher variance in estimation. Figures 6 and 7 plot the results of the difference-in-differences regressions. Figure 6 plots the slope coefficient estimates from value-weighted difference-in-differences regressions of the credit spread and haircut with the whole sample, while Figure 7 plots the results with the chengtou and non-chengtou subsamples. The result is similar to Table 4: the difference in the credit spread (haircut) between the treatment group and control group is close to zero before the default event and goes about 70 basis points two weeks after the default event. This effect is more significant in the non-chengtou subsample.

To sum up, our difference-in-differences regressions results show that all the bonds issued by local SOEs in weak provinces are affected by the default event. On average, their credit spread increases by 49.8 basis point compared with bonds issued by local SOEs in strong provinces. All these results are consistent with what **Implication 1** suggests. Moreover, we find that these effects are more significant in non-Chengtou subsample, which is consistent with **Implication 2**.

5.2 Long Term Effect

In this section, we study whether the default event has a long-term pricing effect on the Chinese bond market. On the one hand, the pricing effect will disappear in the long run if it is the result of the panic in the market caused by the default event. On the other hand, the pricing effect will remain if it is the result of a loss of market belief in the implicit government guarantee caused by the default. Figure 5 shows the plots of the value-weighted average credit spread of the treatment group and control group in the long time window,

[30] Geng and Pan (2019) suggest that the expression of "faith-based" pricing became popular among credit-market investors after 2018. "The faith is hierarchical, with Chengtou bonds, issued by local government financing vehicles, at the top and there has not been a real default occurring to this group of Chengtou bonds."

one-half year before and after the default event. Again, we adjust the red line to make these two lines intersect at November 10, 2020. Figure 5 confirms that the difference between the control group and the treatment group does not disappear after six months. Instead, the difference gap keeps increasing to 1.5 percent after several months. In Section 5.4, we further confirm that the difference gap persists to December 31, 2021.[31] The middle panel plots the chengtou bond subsample, and the right panel plots the non-chengtou bond subsample. In the short term, the jump in the difference between the control group and the treatment group mainly comes from the non-chengtou bond subsample. There is no jump in the chengtou bond subsample in the short term. However, both chengtou and non-chengtou bonds behave similarly in the long term. The difference gap stays at around 1.5 percent six months after the default event.

Then, we conduct difference-in-differences regressions in the longer sample. The previous regressions are repeated with the sample period from May 11, 2020, to May 10, 2021. We use weekly data instead of daily data. Since the firm fundamentals may change in the long term, we add control variables into the regressions to control for firm fundamentals.

$$Spread_{i,t} = \alpha + \gamma_i + \delta_t + \beta_3(event_t \times treatment_i) + controls_{i,t} + u_{i,t} \tag{17}$$

where $controls_{i,t}$ refers to a vector of control variables for bond i at time t. Other variables are the same as those in the previous regressions.

Table 5 summarizes the results. As reported in columns (1) and (2), the coefficients of the interaction terms are 1.496 and 1.493 percent without and with adding control variables, which means the average spread of the treatment group goes up an additional 1.49 percent compared with the control group. The coefficients in the longer sample are three times higher than the previous results. These results suggest that the pricing effect is persistent rather than temporary, and it is not fully apparent immediately. In columns (3)(6), we show our regression results in the chengtou and non-chengtou subsamples. The estimations of

[31] This is the latest data we can get when we write this paper.

coefficients are higher in the non-chengtou subsample, but the statistical significance is still not high because of the small sample size of the non-chengtou bonds. Figures 8 and 9 plot the results of the difference-in-differences regressions. Figure 8 plots the slope coefficient estimates from the value-weighted difference-in-differences regressions of the credit spread with the whole sample, while Figure 9 plots the results with the chengtou and non-chengtou subsamples. The result is similar to Table 5: the difference in the credit spread between the treatment group and control group keeps increasing for several months after the default event, and it is more significant in the non-chengtou subsample. Adding more control variables also makes the results more significant. Different from the results in the short time window, the difference in the credit spread in the chengtou bond subsample also keeps rising, which indicates that it takes some time for the spillover effect of the default event to affect chengtou bonds.

To sum up, the results support the hypothesis that the implicit government guarantee in the Chinese bond market changes persistently after the shock, and the bond price gap does not recover.

5.3 Heterogeneous Effects: Rating

In this section, we test the heterogeneous effects of the default event on bonds with different ratings. The idea is to repeat the main analysis with high-rating or low-rating subsamples and test whether the results are more significant. We define high-rating bonds as those with an implicit rating higher than AA and low-rating bonds as those with implicit ratings equal to or lower than AA. We choose AA as the cutoff point to divide the sample in half, while other cutoffs generate results similar to AA. From Propostion 2, we expect that the effect should be larger for low rating bonds.

Table 6 reports the regression results of different rating subsamples. Columns (1) and (2) are copied from Table 5 to set a benchmark. As reported in columns (3) and (4), the coefficients of interaction terms are -0.143 and -0.081 without and with control variables in the high-rating subsample. As reported in columns (5) and (6), the coefficients of interaction terms are 1.328 and 0.850 without and with control variables in the low-rating subsample. Figure 10 plots the results of difference-in-differences regressions. For the high- rating subsample, there is no jump after the default event. The difference between the treatment group and control group even slightly decreases during the sample period. For the low-rating subsample, the result is more economically significant but less statistically significant because the reduction in the sample size makes our estimation noisier.

To sum up, our main result is driven by low-rating bonds, which is consistent with what **Implication 3** suggests. Investors tend to believe that high-rating bonds are still quite safe even if the belief in an implicit government guarantee has been broken. Then, the credit spread of bonds issued by an SOE located in a province with a strong financial condition does not diverge from that of bonds issued by an SOE located in a province with a weak financial condition.

6 Placebo Tests and Additional Supportive Evidence

6.1 Baoding Tianwei Default Event

In this section, we repeat our analysis with Baoding Tianwei's default, motivated by Jin et al. (2020). They study the effect of the IGG on Chinese SOEs based on Baoding Tianwei's default, which is the first SOE default event in China. Our paper is different from their paper in two aspects. First, Baoding Tianwei Group is owned by the central government instead of the local government. The default of a local SOE will have a detrimental effect on the promotion of officials in that province. Thus, a local government tends to provide a higher level of an IGG, whereas central government officials are less enthusiastic about a bailout because they pay more attention to long-term interests. Second, Jin et al. (2020) focus more on the real effect, whereas we want to study the asset pricing implications of the default event. Despite these differences, we hope to revisit the default of Baoding Tianwei as a placebo test. The data screening process is the same as that in Section 3.1.

Panel A of Table 7 reports the regression results of the Baoding Tianwei default event. The default event takes place on March 24, 2015, and we use the same time window as in Jin et al. (2020) (i.e. from March 24 to May 22, 2015). Similar to Jin et al. (2020), in columns (1) and (2), the treatment group is formed by SOEs and the control group is formed by non-SOEs. In columns (3) and (4), the treatment and control groups are formed following the method in Section 4.1. Jin et al. (2020) employ an equal-weighted regression instead of a value-weighted regression; thus, we try both. We run equal-weighted regressions in columns (1) and (3) and value- weighted regressions in columns (2) and (4). We do not find any significant result when we construct treatment and control groups following Section 4.1. The credit spread of bonds issued by SOEs even decreases slightly compared with that of non-SOEs after the default event. Figure 11 further demonstrates our finding. The treatment group and control group are constructed the same way as in Section 4.1. There is no significant difference between the treatment group and control group after Baoding Tianwei's default.

6.2 Chaori Default Event

Another important default event discussed by Mo et al. (2021) is Chaori's default, which took place on March 4, 2014. Jin et al. (2020) study this event in their paper as well. Chaori is a privately owned solar panel manufacturer, which is in the same industry as Baoding Tianwei Group. It is the first corporate bond default in China and indicates the beginning of the no-bailout reform in China. We also replicate our result using Chaori's default as another placebo test.

Panel B of Table 7 reports the regression results of the Chaori default event. The event window is from February 7 to April 4, 2014. In columns (1) and (2) the treatment group is formed by SOEs and the control group is formed by non-SOEs. In columns (3) and (4), the treatment and control groups are formed following the method in Section 4.1. We run equal-weighted regressions in columns (1) and (3) and value-weighted regressions in columns (2) and (4). We do not find any significant results when we construct the treatment and control groups following Section 4.1. However, the average difference between the credit spread of bonds issued by non-SOEs and SOEs becomes significantly higher after the default. Figure 12 further demonstrates our findings. The treatment group and control group are constructed the same way as in Section 4.1. There is no significant difference between the treatment group and the control group after Chaori's default. Our result is consistent with the result in Mo et al. (2021).

6.3 Financial Fraud Explanation

While our main result in Section 4.1 suggests that Yongcheng's default shook investors' belief in the IGG and led to an increase in the credit spread of bonds issued by local SOEs, financial fraud might also explain this result. According to their 2020Q3 financial report, the company has more than 47 billion yuan in cash, so it came as a great surprise to everyone when it became unable to pay back its debt of 1 billion yuan. One possibility is that investors tend to lose their trust in the financial reports of local SOEs, especially in poor provinces where financial reports are less reliable. As a consequence, the credit spread of bonds issued by local SOEs in these provinces begins to increase after the default event.

We test the financial fraud explanation with another event. On July 27, 2021, China Securities Regulatory Commission confirmed that Yongcheng was had conducted financial fraud, and the executives of Yongcheng were punished. We replicate our main results with a new sample period, from July 12 to August 13. Panel A of Table 8 reports the result. We do not find any evidence that the average spread of the treatment group goes up compared with the control group. Figure 13 further demonstrates this result. The average credit spread of the treatment group even decreases slightly, although not to a significant degree. All of the above evidence indicates that financial fraud is not the reason for the bond market reaction after Yongcheng's default.

6.4 Longer Sample Period

In this section, we repeat our main result with a longer sample, from May 11, 2020, to December 31, 2021. We already studied the long time effect in Section 4.2. However, the difference in the credit spread in Figure 5 drops in the last two months. We try to make sure that the average spread of the treatment group and control group does not converge in the future.

Panel B of Table 8 and Figure 14 report the result. After we extend the sample period for another half year, the result is similar to the previous one (i.e., Table 5, Figure 5, and Figure 8). The only difference is that the data in Figure 14 are on a monthly basis instead of weekly.

7 Policy Implication

7.1 Back of Envelope Calculation

In this section, we introduce three ways to examine the economic significance of the pricing effect of the IGG. The first and most direct way is to interpret the change in the credit spread as the cost of capital. Consider a bond with a face value of 100 RMB. The average bond issued by weak provinces has a coupon rate of 5.25%, a maturity of 3.49 years, and a yield to maturity of 6.44%. After the default event, the yield to maturity would increase by 150 bps if we ignore the change in the yield to maturity of bonds issued by strong provinces. Therefore, the cost of capital for local SOEs and LGFVs in these provinces increases from 6.44% to 7.94% in response to the shock.

Second, we translate the impact of changes in the credit spread to changes in total value. The total face value of bonds issued by local SOEs and LGFVs in weak provinces is around 2,019 billion RMB.[32] With a coupon rate of 5.25%, a maturity of 3.49 years, and a discount

[32] We use the full sample when we calculate total bond value (i.e., all corporate bonds and enterprise bonds

rate equal to the yield to maturity, we can calculate the change in value using the following formula:

$$B = \frac{F}{(1+y/2)^{T\times 2}} + \sum \frac{F\times C}{(1+y/2)^{i}} \tag{18}$$

where B is the bond value, F is the face value, C is the coupon rate, and y is the yield to maturity (i.e., the discount rate). Given the number above, the net present value (NPV) before the event is 1,945 billon RMB, while the NPV after the event is 1,856 billion RMB. In other words, if we assume the shock persists for more than 3.49 years, which is likely based on our finding in Section 5.4, the shock reduces the market value of bonds issued by local SOEs and LGFVs in weak provinces by 89 billion RMB, which is about 5% of the total value.

The third way to examine the economic significance is to translate the change in the credit spread to changes in the annual interest payment. If the cost of debt increases by 150 bps, the interest payment will increase by approximately 2,019*1.5%=30.3 billion RMB per year. Although the amount looks smaller, it is an annual payment and persists in the future.

To sum up, the back-of-the-envelope calculation shows that the break in the IGG has a huge impact on the financing cost of local SOEs in weak provinces. The existence of an IGG makes these governments more vulnerable.

7.2 Policy Implications on Reducing IGG

After the 4 trillion yuan stimulus plan in 2009, there is a surge in Chinese local government debt, especially implicit debt. The implicit debt contains two parts: local SOE debts and LGFV debts. Local SOE debts are a result of the soft budget constraint issue: local governments lack the commitment to liquidate losing SOEs because of the too big to fail premise, while LGFV debts are a result of the infrastructure investment demand driven by regional GDP competition. Our empirical result suggests that local SOE bonds, which are an impor-

issued by local SOEs in the weak provinces, including PR bonds, bonds with no transactions, bonds close to maturity, and so on).

tant part of implicit local government debt, have an amplification effect on local government financial conditions. When a shock negatively affects a local government's budget, investors will change their belief in IGG for local SOE bonds. This will raise the cost of raising funding for local SOEs and further worsen the financial condition of that local government.

Realizing the increasing risks caused by local government debt, starting in 2014, the central government launched a series of regulations to resolve the problem. We have listed some important regulations in Section 2.2. One important objective of these regulations is to break the IGG. However, our empirical results show that IGG still exists in the Chinese bond market despite the great effort of the central government. In an ideal bond market, the fundamental information of bond issuers is fully revealed, and the default probability is well perceived by bond investors. The price can exactly reflect the risk of bonds, and investors invest in different bonds depending on their risk preference. However, the Chinese bond market is far from that ideal because of the prevailing IGG belief. The price of bonds issued by local SOEs is largely driven by investors' beliefs about the local governments' attitudes.

We suggest that the central government should continue to formulate more regulations to further reduce the prevalence of IGGs in the bond market. Firstly, our model outlined in Section 3.4 suggests that the spillover effect in the bond market can be alleviated if investors know precisely whether a no-bailout outcome is driven by government attitude or firm characteristics. Local governments should communicate clearly how bailout decisions are made. This will help investors form stable beliefs and, in turn, stabilize the market. In addition, for local SOEs, the Chinese central government should deepen its no-bailout reforms. Stricter laws are required to compel local governments to liquidate loss-making SOEs, even though it may be painful in the short term. For LGFVs, a clearer rule should be made to differentiate investment projects. For projects that can potentially generate good cash flow to repay their debt in the future, local governments should stop providing an IGG for them. The yield of corresponding bonds should be market oriented. In other words, the local government should disclose more information on these projects and let the market decide the cost of financing. For projects that cannot generate revenue but provide public goods that have great externalities, local governments should provide explicit guarantees rather than implicit guarantees. These projects should be financed through municipal bonds instead of corporate bonds since the cost and risk of these projects should be borne by the government rather than investors.

8 Conclusion

Many researchers focus on the spillover effect of idiosyncratic shocks. In this paper, we suggest that a small idiosyncratic shock can translate into a large systematic shock by changing beliefs about the IGG. First, we develop a model to illustrate this mechanism. When the government does not bailout a default case, investors cannot discern the specific reason and will adjust their beliefs regarding which bailout regime they are in. This change in belief about the IGG will affect the entire bond market, especially bonds with a high default risk.

We find empirical evidence in China's bond market, utilizing the Yongcheng default event. We identify the pricing effect of an IGG using the difference-in-differences method, with the default event serving as a cutoff. We discover that the effect is an increase of 49.8 basis points, which is both economically and statistically significant. Additionally, we find that this effect is persistent. These results are in line with our model's predictions.

Our findings have several policy implications. Bonds issued by local SOEs, which constitute an important part of implicit local government debt, have an amplification effect on the financial conditions of local governments. When a shock negatively impacts a local government's budget, investors will revise their belief in the IGG for local SOE bonds. This revision will increase the cost of raising funds for local SOEs and, in turn, exacerbate the financial condition of that local government. Our back-of-the-envelope calculations indicate that the cost of financing can have a substantial impact since the shock is persistent. To mitigate this issue, we recommend that local governments should clearly communicate how bailout decisions are made to stabilize investors' beliefs. Additionally, the central government should continue to formulate more regulations to further reduce IGGs in the bond market, despite the significant efforts that have already been undertaken.

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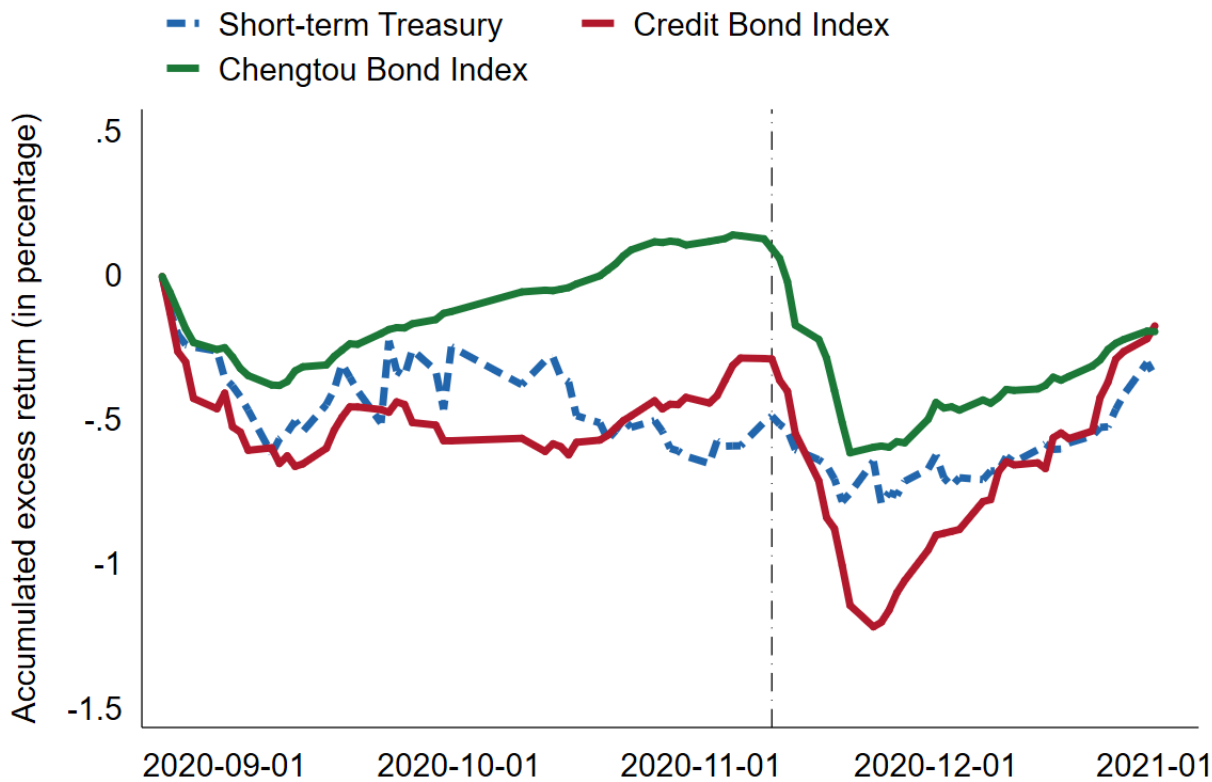

Figure 1: **Proformance of Chinese Bond Market.** This figure plots the overall price trend in the Chinese bond market from September 2021 to December 2021, expressed by the accumulated excess return in percentages (i.e., the value of a portfolio constructed by borrowing one unit of RMB with the risk-free rate and purchasing assets with one unit of RMB at the beginning). The dashed black line is November 10, when the default happens. The blue line is the accumulated excess return of the short-term treasury, with a maturity of less than half a year. The red line is the accumulated excess return of the credit bond index, measured by *Huaxia Credit Bond ETF, 005581.OF*, which tracks the 3- to 5-year medium and high grade pledged credit bond index of SSE. The green line is the accumulated excess return of the chengtou bond index, measured by *Haifutong Chengtou Bond ETF, 511220.OF*, which tracks the SSE urban construction investment bond index. Chengtou bonds (i.e., urban construction investment bonds) are introduced in Section 2.2.

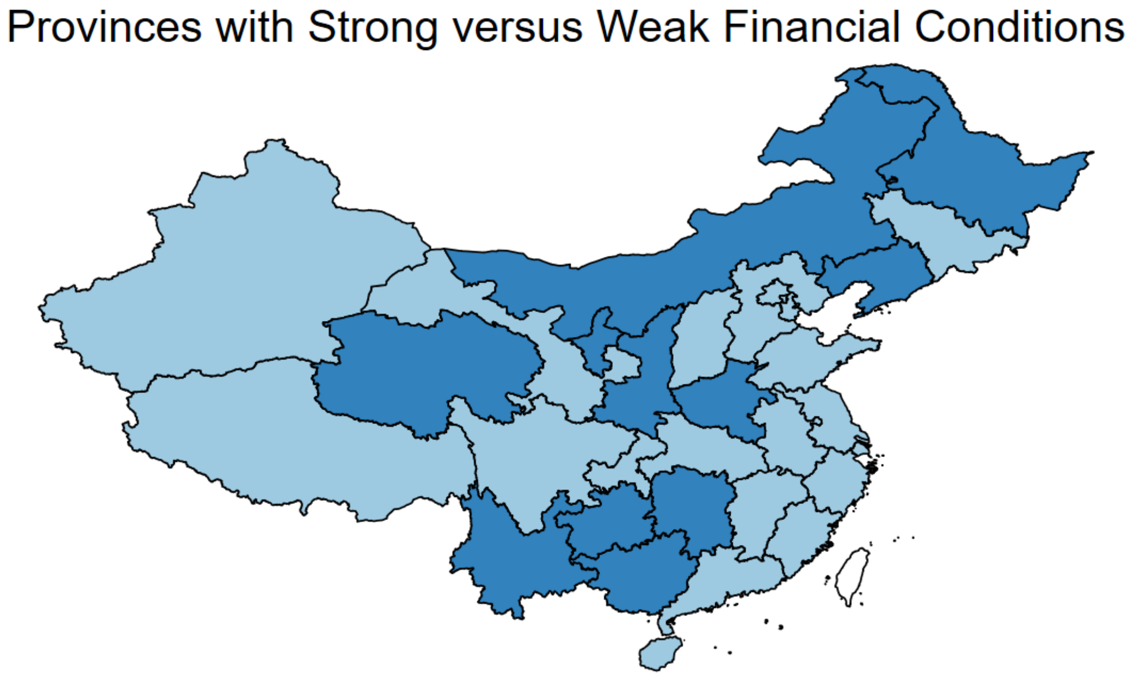

Figure 2: **Geographical Distribution of Provinces with Strong vs. Weak Financial Conditions.** This figure plots the geographical distribution for the treatment group and control group. Provinces with local governments in strong financial condition are in light blue. Provinces with local governments in weak financial condition are in dark blue. Local SOEs located in strong provinces belong to the control group, and those located in weak provinces belong to the treatment group.

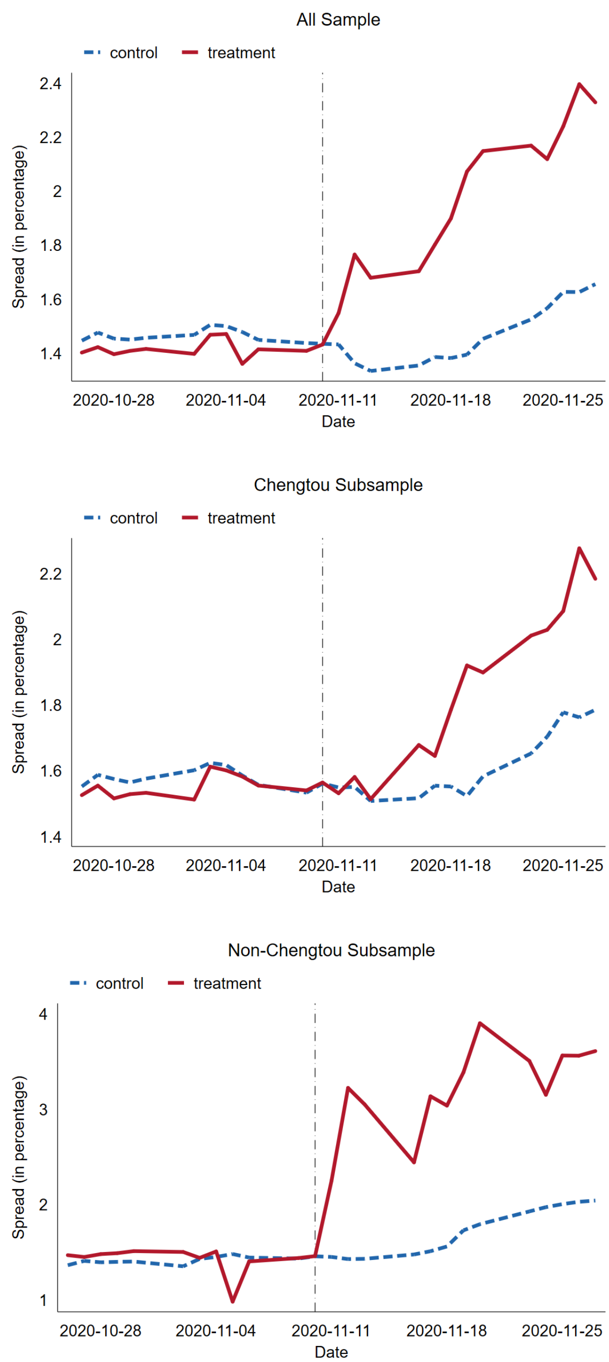

Figure 3: **Market Trend: Credit Spread.** These figures plot the value-weighted average annualized credit spread of the treatment group and control group. The top panel plots the whole sample. The middle panel plots the chengtou bond subsample. The bottom panel plots the non-chengtou bond subsample. Chengtou bonds are introduced in Section 2.2. The sample period is from October 26, 2020, to November 27, 2020. The dotted vertical line indicates the event time, November 10, 2020, when Yongcheng Coal Group defaults. We adjust the red line to make these two lines intersect at November 10, 2020.

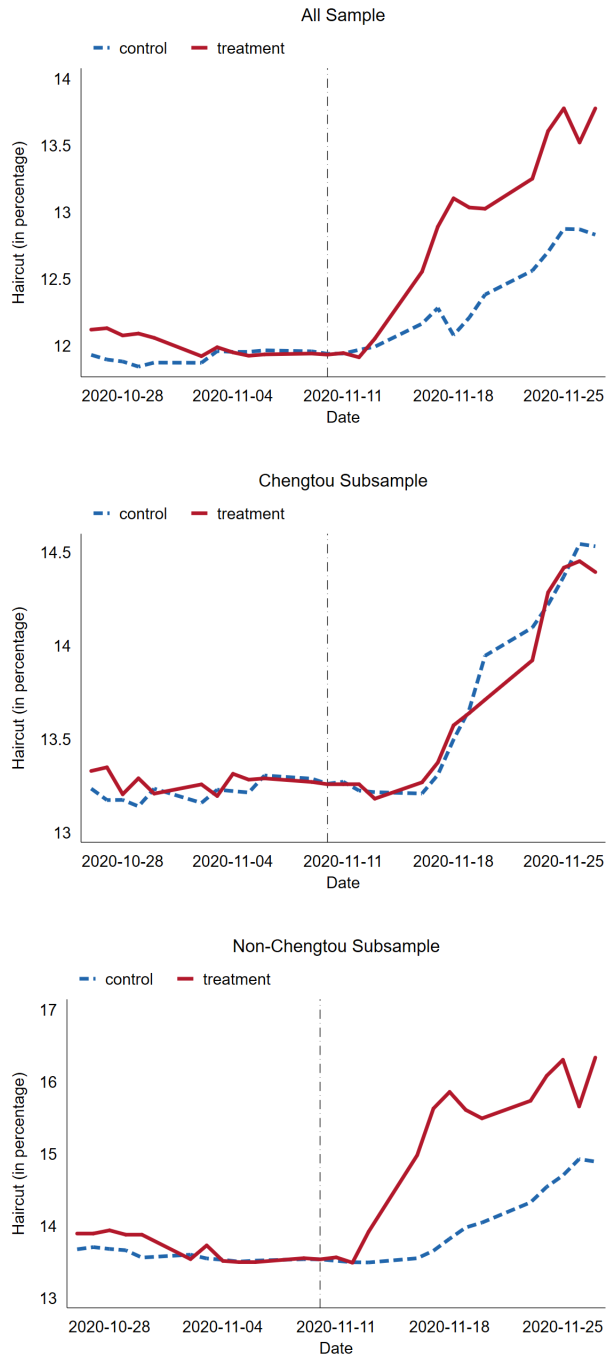

Figure 4: **Market Trend: Haircut.** These figures plot the value-weighted average annualized haircut of the treatment group and control group. The top panel plots the whole sample. The middle panel plots the chengtou bond subsample. The bottom panel plots the non-chengtou bond subsample. Chengtou bonds are introduced in Section 2.2. The sample period is from October 26, 2020, to November 27, 2020. The dotted vertical line indicates the event time, November 10, 2020, when Yongcheng Coal Group defaults. We adjust the red line to make these two lines intersect at November 10, 2020.

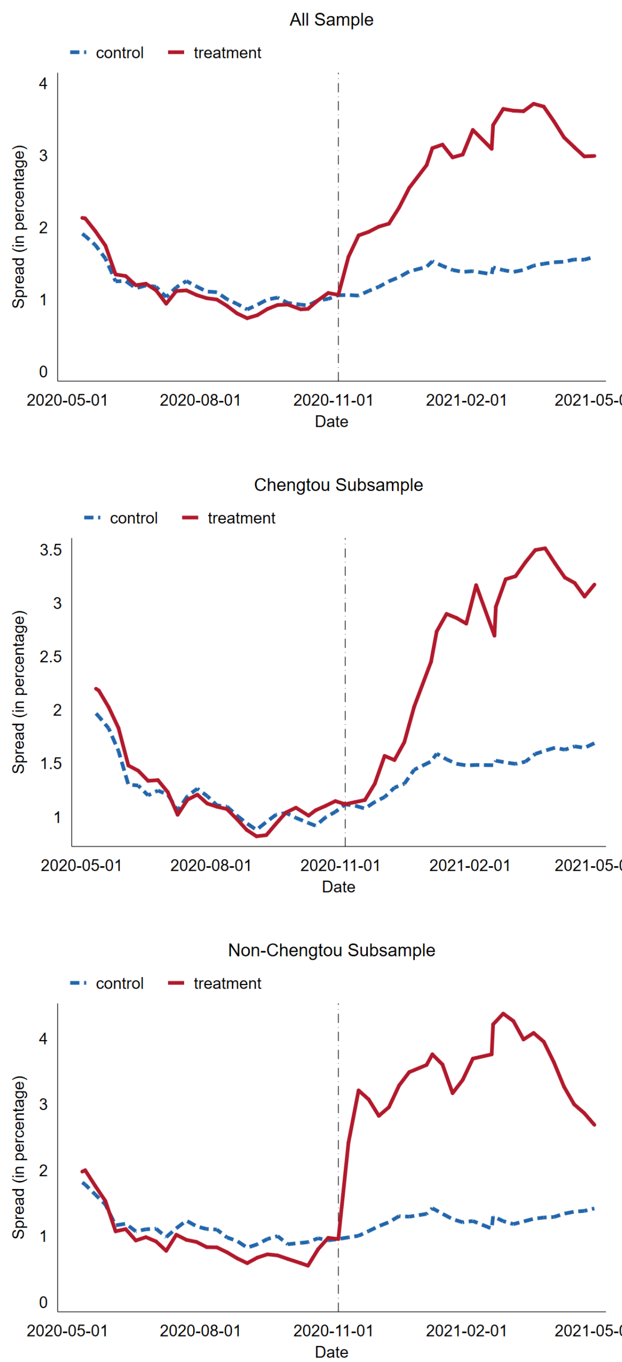

Figure 5: **Market Trend: Credit Spread.** These figures plot the value-weighted average annualized credit spread of the treatment group and control group. The top panel plots the whole sample. The middle panel plots the chengtou bond subsample. The bottom panel plots the non-chengtou bond subsample. Chengtou bonds are introduced in Section 2.2. The sample period is from May 11, 2020, to May 10, 2021. The dotted vertical line indicates the event time, November 10, 2020, when Yongcheng Coal Group defaults. We adjust the red line to make these two lines intersect at November 10, 2020.

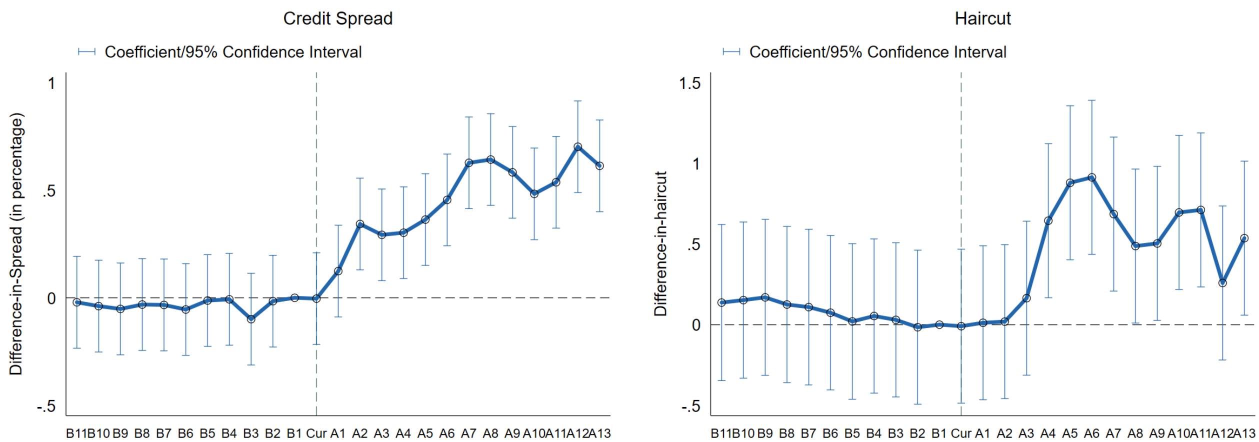

Figure 6: **Main Result: Difference-in-differences Regressions with Credit Spread and Haircut.** The figures show slope coefficient estimates from value-weighted difference-in-differences regressions of credit spread (left panel) and haircut (right panel) around the default of Yongcheng Coal Group. The dotted vertical line is November 10, 2020, when Yongcheng Coal Group defaults. The point estimation immediately before the event date is normalized to zero. The thin line plots the 95% confidence interval of coefficients. The sample is from October 26 to November 27, 2020, on a daily basis. B_i refers to the ith day before the event, and A_j refers to the jth day after the event.

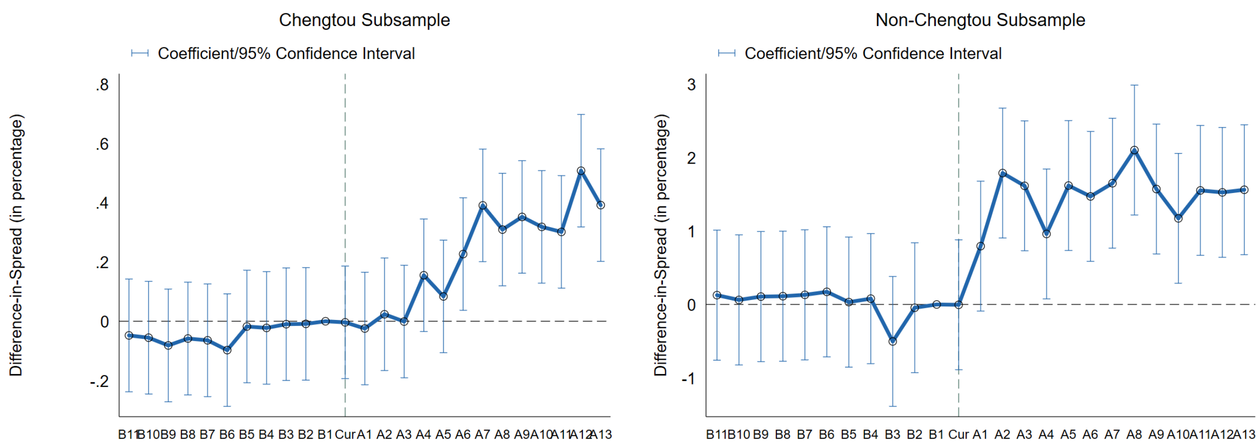

Figure 7: **Heterogeneity Effect: Chengtou and non-Chengtou.** The figures show slope coefficient estimates from value-weighted difference-in-differences regressions of the credit spread of the chengtou subsample (left panel) and non-chengtou subsample (right panel) around the default of Yongcheng Coal Group. The dotted vertical line is November 10, 2020, when Yongcheng Coal Group defaults. The point estimation immediately before the event date is normalized to zero. The thin line plots the 95% confidence interval of coefficients. The sample is from October 26 to November 27, 2020, on a daily basis. B_i refers to the ith day before the event, and A_j refers to the jth day after the event.

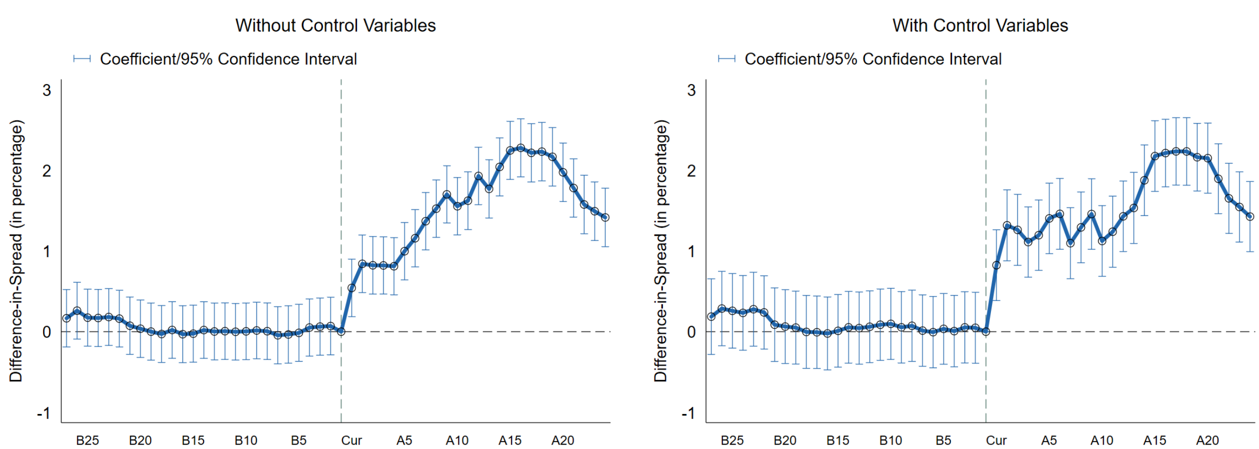

Figure 8: **Main Result 2: Difference-in-differences Regressions in Long Sample Period.** The figures show slope coefficient estimates from value-weighted difference-in- differences regressions of the credit spread without control variables (left panel) and with control variables (right panel) around the default of Yongcheng Coal Group. The dotted vertical line is November 10, 2020, when Yongcheng Coal Group defaults. The point estimation immediately before the event date is normalized to zero. The thin line plots the 95% confidence interval of coefficients. The sample is from October 26 to November 27, 2020, on a daily basis. B_i refers to the ith day before the event, and A_j refers to the jth day after the event.

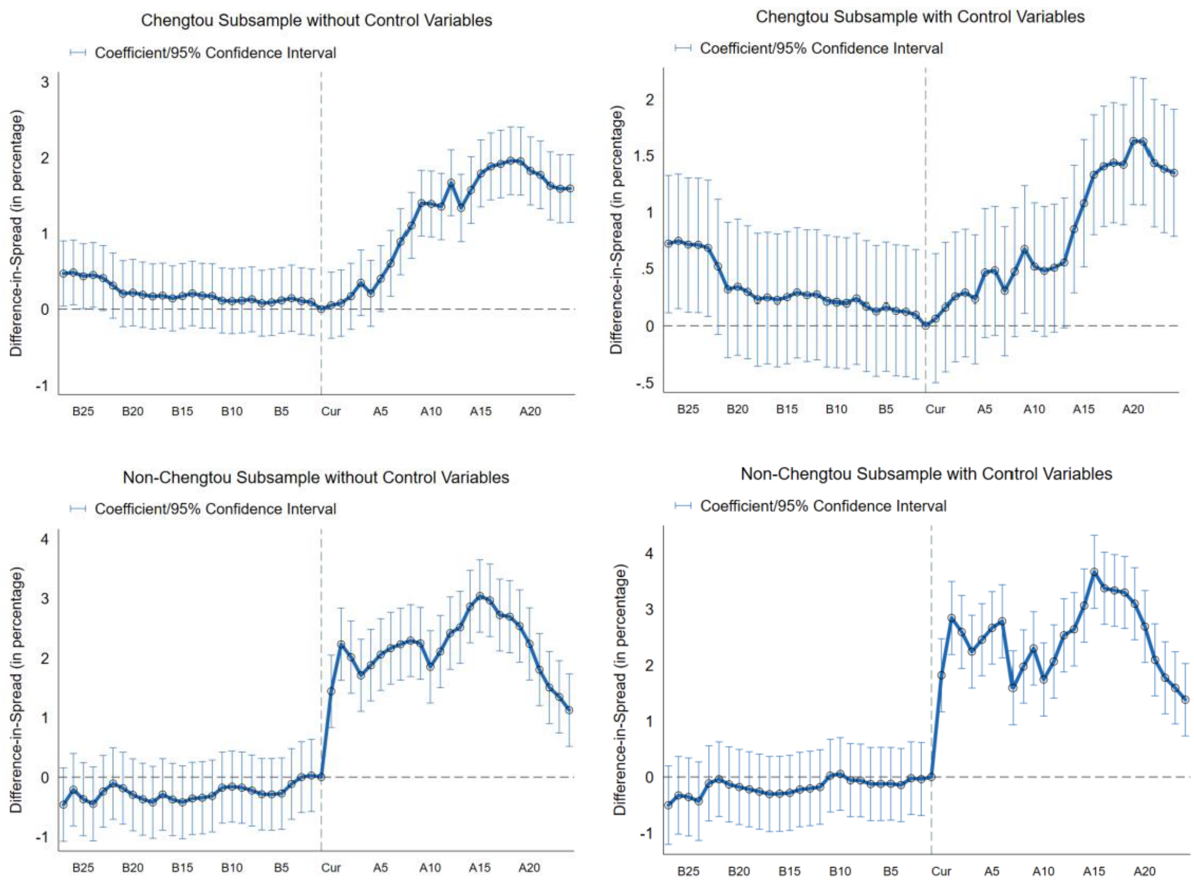

Figure 9: **Heterogeneity Effect: Chengtou and non-Chengtou.** The figures show slope coefficient estimates from value-weighted difference-in-differences regressions of the credit spread without control variables (left panel) and with control variables (right panel) around the default of Yongcheng Coal Group. The two graphs at the top are the results of chengtou bonds, and the two graphs at the bottom are the results of non-chengtou bonds. The dotted vertical line is November 10, 2020, when Yongcheng Coal Group defaults. The point estimation immediately before the event date is normalized to zero. The thin line plots the 95% confidence interval of coefficients. The sample is from October 26 to November 27, 2020, on a daily basis. B_i refers to the ith day before the event, and A_j refers to the jth day after the event.

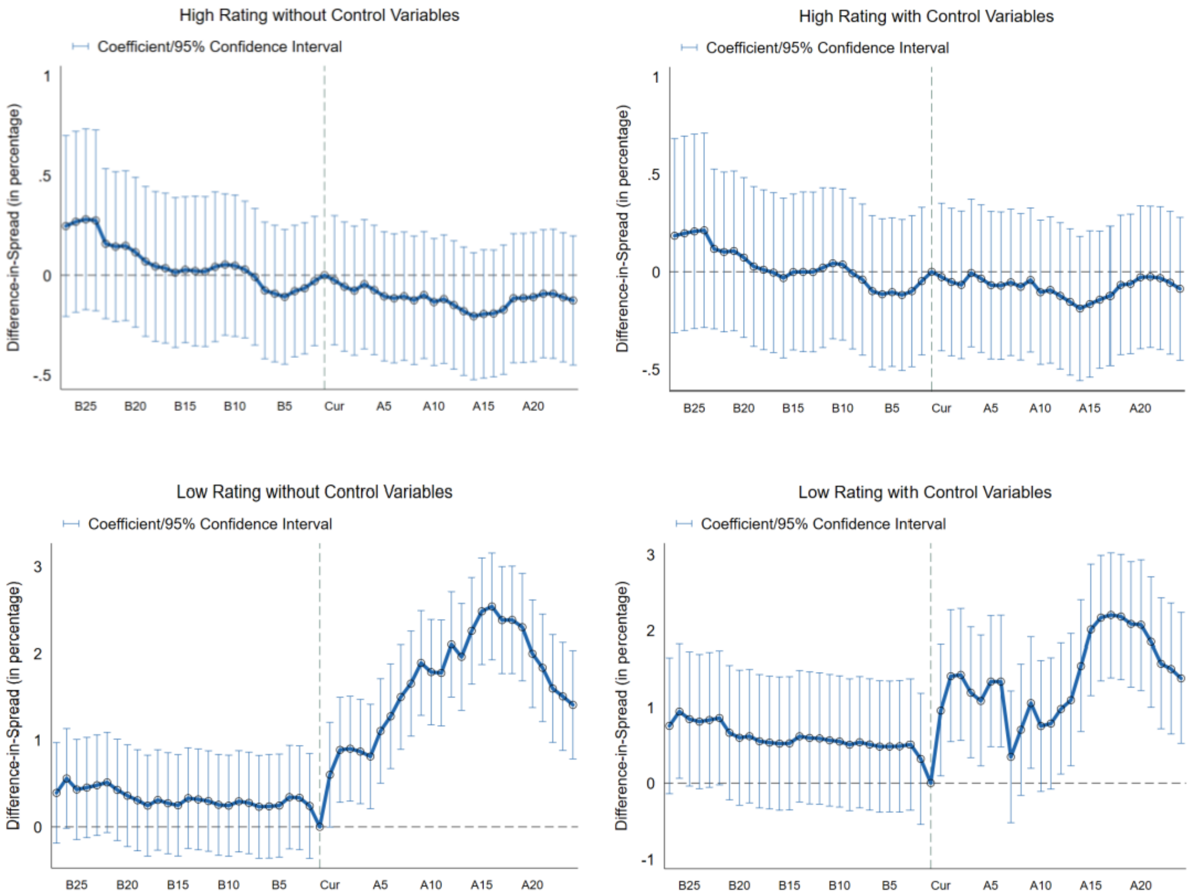

Figure 10: **Heterogeneity Effect: High Rating and Low Rating.** The figures show slope coefficient estimates from value-weighted difference-in-differences regressions of the credit spread without control variables (left panel) and with control variables (right panel) around the default of Yongcheng Coal Group. The two graphs at the top are the results of high-rating bonds, and the two graphs at the bottom are the results of low-rating bonds. The dotted vertical line is November 10, 2020, when Yongcheng Coal Group defaults. The point estimation immediately before the event date is normalized to zero. The thin line plots the 95% confidence interval of coefficients. The sample is from October 26 to November 27, 2020, on a daily basis. B_i refers to the ith day before the event, and A_j refers to the jth day after the event.

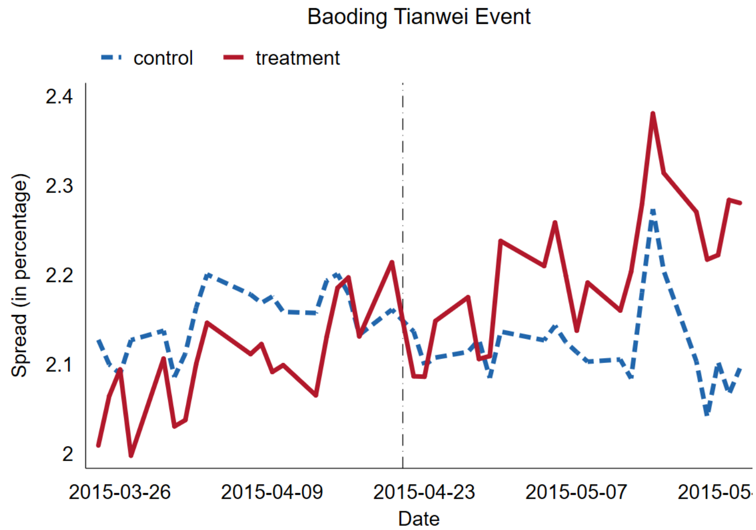

Figure 11: **Placebo Test: Baoding Tianwei Default Event.** This figure plots the average annualized credit spread of the treatment group and control group. The definition of the treatment group and control group is the same as that shown in our main results. The dotted vertical line indicates the event time, April 23, 2015, when Baoding Tianwei defaults. The sample period is from March 24, 2015 to May 22, 2015. We adjust the red line to make these two lines intersect at April 23, 2015.

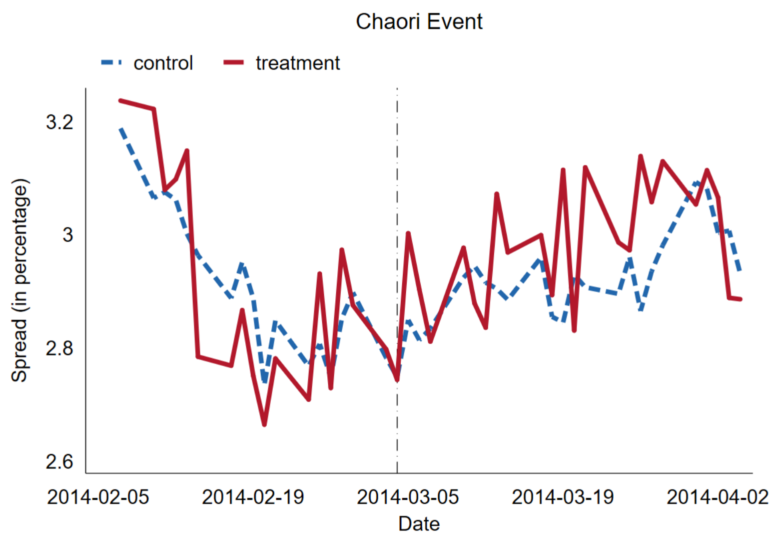

Figure 12: **Placebo Test: Chaori Default Event.** This figure plots the average annualized credit spread of the treatment group and control group. The definition of the treatment group and control group is the same as that shown in our main results. The dotted vertical line indicates the event time, March 4, 2014, when Chaori defaults. The sample period is from February 7, 2014, to April 4, 2014. We adjust the red line to make these two lines intersect at March 4, 2014.

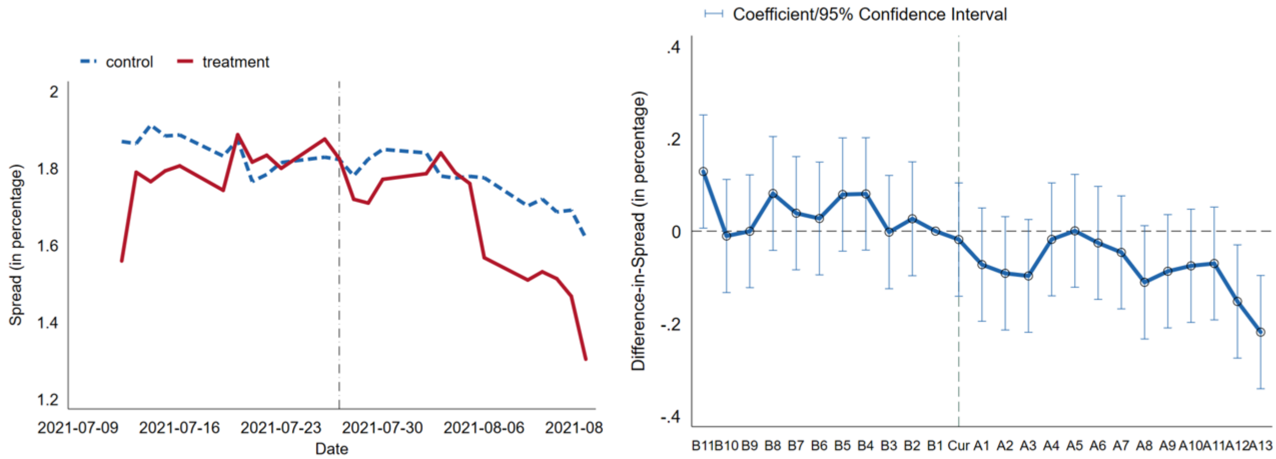

Figure 13: **Robustness Test: Financial Fraud Announcement.** These figures plot the results around Yongcheng's financial fraud announcement. The sample is from July 12, 2021, to August 13, 2021. The dotted vertical line is July 27, when the announcement is made. The left panel plots the average annualized credit spread of the control group and treatment group. The right panel shows the slope coefficient estimates from difference-in-differences regressions of the credit spread. Both of them use value-weighted regressions. The logic of these graphs exactly follows our main results (i.e., Figure 2 and Figure 5).

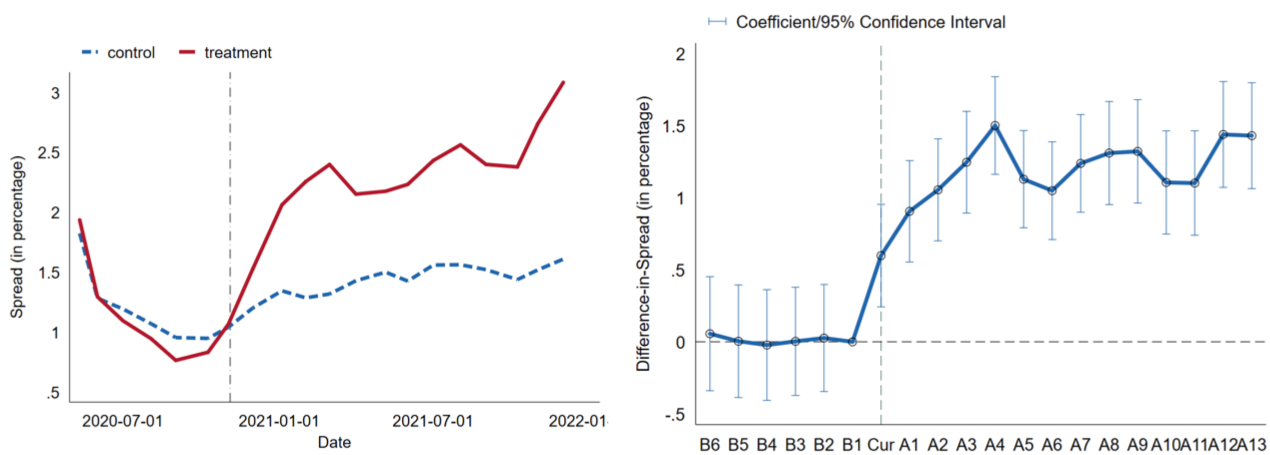

Figure 14: **Robustness Test: Longer Sample Period.** These figures plot the results using a longer sample period, from May 11, 2020, to December 31, 2021. The dotted vertical line is November 10, 2020, when Yongcheng Coal Group defaults. The left panel plots the average annualized credit spread of the control group and treatment group. The right panel shows the slope coefficient estimates from difference-in-differences regressions of the credit spread. Both of them use value-weighted regressions. The right panel is on a monthly basis instead of weekly. With this exception, the logic of these graphs exactly follows our main results (i.e., Figure 2 and Figure 5).

Table 1: **Event Timeline**

This table summarizes the timeline of the major events. It mainly presents information for Yongcheng Coal Group, as well as the reactions of the central government.

Date	Event
2020.11.10	Yongcheng Coal Group failed to repay the bond coded 012001559.IB and declared a default.
2020.11.12	Yongcheng Coal Group triggered protection clause and declared defaults for 20 bonds.
2020.11.16	Central bank released liquidity for 800 billion yuan.
2020.11.21	Office of Financial Stability and Development Committee stated that the government will bear no tolerance on enterprises escaping their debt and kept the market in order. Disclosure of false information and the illegal transfer of assets will be punished.
2021.07.27	China Securities Regulatory Commission confirmed that Yongcheng Coal Group had conducted financial fraud, and the executives of Yongcheng were punished.

Table 2: **Bond Summary Statistics**

This table reports the summary statistics of the sample. The table presents the number of observations, mean, standard deviation, 10th percentile, median, and 90th percentile. Panel A presents the summary statistics of bond information. Panel B presents the summary statistics of bond daily transactions from October 26 to November 27, 2020. Panel C presents the summary statistics of bond weekly transactions from May 11, 2020, to May 10, 2021.

Panel A: Bond Level						
Variables	Observations	Mean	Median	Std	P10	P90
IssueSize (billion)	2,686	1.37	1.00	1.28	0.50	2.50
Chengtou	2,689	0.70	1.00	0.46	0.00	1.00
List	2,689	0.10	0.00	0.30	0.00	1.00
CSOE	2,689	0.14	0.00	0.35	0.00	1.00
Exch	2,689	0.49	0.00	0.50	0.00	1.00
Panel B: Short-Window Bond Panel						
Variables	Observations	Mean	Median	Std	P10	P90
Price	22,238	88.78	99.85	22.37	57.91	102.90
Spread	22,238	2.08	1.51	2.13	0.47	4.20
TradeVol(million)	22,238	5.01	0.00	27.60	0.08	0.00
Zerotrade	22,238	0.89	1.00	0.32	0.00	1.00
Duration	22,238	3.30	2.85	1.93	1.03	5.85
Rating	22,238	4.63	5.00	1.34	2.00	6.00
Haircut	32,695	13.92	10.00	10.09	7.00	29.00
Panel C: Long-Window Bond Panel						
Variables	Observations	Mean	Median	Std	P10	P90
Price	48,742	100.57	100.50	3.52	98.60	103.26
Spread	48,740	1.37	0.92	1.92	0.07	2.99
TradeVol(million)	48,742	1.66	0.00	12.60	0.16	0.00
Zerotrade	48,742	0.86	1.00	0.35	0.00	1.00
Duration	48,742	2.98	2.69	1.80	0.89	5.22
Lev	40,039	62.89	64.64	12.11	47.19	76.87
ROE	37,022	2.99	1.94	4.65	-0.16	8.49
Haircut	42,281	14.85	10.00	11.48	7.00	31.00

Table 3: **Province Summary Statistics**

This table reports the summary statistics of provinces. The table presents the mean of variables related to financial conditions of all provinces, provinces in a strong financial condition and provinces in a weak financial condition. The units of GDP, Annual Revenue, Annual Expenditure and Total Debt are in billion RMB. Government Leverage refers to annual revenue divided by total debt. Government Leverage2 refers to GDP divided by total debt. We use the average value between 2017 and 2019 to avoid reverse causality.

Variables	All Provinces	Weak Province	Strong Province
GDP	2,934	2,037	3,427
Annual Revenue	312	187	381
Annual Expenditure	608	516	658
Total Debt	605	600	607
Government Leverage	0.522	0.304	0.642
Government Leverage2	4.613	3.256	5.359

Table 4: **Main Result: Short-window DiD Regression**

This table reports the results of difference-in-differences regressions in a short time window (i.e., from October 26 to November 27, 2020), based on daily data. The treatment group is formed by SOEs in provinces in a weak financial condition. We exclude SOEs controlled by the central government. The dependent variable in columns (1), (3), and (5) is the credit spread. The dependent variable in columns (2), (4), and (6) is the haircut.

Sample	All		Chengtou		Nonchengtou	
	(1)	(2)	(3)	(4)	(5)	(6)
Crossterm	0.498*	0.432	0.272*	-0.126	1.409	1.183
	(0.280)	(0.447)	(0.144)	(0.193)	(1.372)	(0.966)
Date FE	Y	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y	Y
Bond Number	796	824	686	460	110	364

Notes: Standard errors clustered by bonds in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 5: **Main Result 2: Long-window DiD Regression**

This table reports the results of difference-in-differences regressions in a long time window (i.e., from May 11, 2020 to May 10, 2021), based on weekly data. The treatment group is formed by SOEs in provinces in a weak financial condition. We exclude SOEs controlled by the central government. The dependent variable is the credit spread.

Sample	All		Chengtou		Non-Chengtou	
	(1)	(2)	(3)	(4)	(5)	(6)
Crossterm	1.496**	1.493*	0.991**	0.520	2.403	2.638
	(0.674)	(0.883)	(0.476)	(0.542)	(1.601)	(1.681)
Lev		0.033		0.112*		-0.043
		(0.033)		(0.064)		(0.030)
Rating		-0.872**		-0.634		-1.713**
		(0.355)		(0.432)		(0.667)
ROE		0.007		0.006		-0.009
		(0.013)		(0.021)		(0.020)
Date FE	Y	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y	Y
Bond Number	807	613	498	388	309	225

Notes: Standard errors clustered by bonds in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 6: **Heterogeneity Effect: Rating**

This table reports the results of difference-in-differences regressions in a long time window (i.e., from May 11, 2020, to May 10, 2021), based on weekly data. The treatment group is formed by SOEs in provinces in a weak financial condition. We exclude SOEs controlled by the central government. The dependent variable is the credit spread.

Sample	All		High Rating		Low Rating	
	(1)	(2)	(3)	(4)	(5)	(6)
Crossterm	1.496**	1.493*	-0.143	-0.081	1.328*	0.850
	(0.674)	(0.883)	(0.090)	(0.093)	(0.786)	(1.030)
Lev		0.033		0.011		0.182
		(0.033)		(0.011)		(0.107)
Rating		-0.872**		-0.096		-1.930**
		(0.355)		(0.061)		(0.520)
ROE		0.007		0.002		-0.013
		(0.013)		(0.004)		(0.025)
Date FE	Y	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y	Y
Bond Number	807	613	401	376	419	249

Notes: Standard errors clustered by bonds in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 7: **Placebo Tests: Baoding Tianwei and Chaori Event**

This table reports the regression results of two placebo tests: Baoding Tianwei and Chaori event. Panel A reports the results of difference-in-differences regressions in Baoding Tianwei's event window (i.e., from March 24 to May 22, 2015). Panel B reports the results of difference-in-differences regressions in Chaori's event window (i.e., from February 7 to April 4, 2014). In columns (1) and (2), the treatment group is formed by SOEs and the control group is formed by non-SOEs. In columns (3) and (4), the treatment group is formed by SOEs in provinces in a weak financial condition, and we exclude SOEs controlled by the central government. We run equal-weighted regressions in columns (1) and (3) and value-weighted regressions in columns (2) and (4).

Panel A: Baoding Tianwei Default Event				
Group by	SOE		Province	
	(1)	(2)	(3)	(4)
Crossterm	-0.091	-0.087*	0.015	0.053
	(0.070)	(0.054)	(0.056)	(0.044)
Date FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
Bond Number	453	453	242	242
Panel B: Chaori Default Event				
Group by	SOE		Province	
	(1)	(2)	(3)	(4)
Crossterm	-0.292***	-0.256***	0.119	0.090
	(0.055)	(0.054)	(0.089)	(0.073)
Date FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
Bond Number	614	614	308	308

Notes: Standard errors clustered by bonds in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 8: **Robustness Tests: Financial Fraud Explanation and Longer Sample**

This table reports the regression results of two additional robustness tests. Panel A reports the results of difference-in-differences regressions in the financial fraud announcement event window (i.e., from July 12 to August 13, 2021). Panel B reports the results of difference-in-differences regressions of the main result with the longer sample (i.e., from May 10, 2020, to December 31, 2021). We run equal-weighted regressions in column (1) and value-weighted regressions in column (2).

Panel A: Financial Fraud Announcement		
	(1)	(2)
Crossterm	-0.118	-0.171
	(0.079)	(0.127)
Date FE	Y	Y
Bond FE	Y	Y
Bond Number	263	263
Panel B: Longer Sample Period		
	(1)	(2)
Crossterm	1.203***	1.096***
	(0.315)	(0.234)
Date FE	Y	Y
Bond FE	Y	Y
Bond Number	1104	1104

Notes: Standard errors clustered by bonds in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

A Proof

Proposition 1:

For bailout belief adjustment, we have

$$\Delta\hat{\pi}_t = |\hat{p}^H_t - \hat{p}^H_{t-1}|(\pi_H - \pi_L) \tag{19}$$

Let $\pi_{\epsilon_t} = 1$. Combined with equation (5), we have

$$\Delta\hat{\pi}_t = \ |\frac{1-\pi_H}{(1-\pi_H)\hat{p}^H_{t-1}+(1-\pi_L)(1-\hat{p}^H_{t-1})} - 1|\hat{p}^H_{t-1}(\pi_H - \pi_L) \tag{20}$$

When π_L increases and other parameter remains the same, the red part becomes smaller, which makes the first part less negative. In the same time, $\pi_H - \pi_L$ also becomes smaller. As a result, $\Delta\hat{\pi}_t$ is monotonic decreasing with π_L, which means the bailout belief adjustment is smaller in strong province.

B Variable Definitions

Panel A: Bond Characteristic		
Name	Definition	Sources
IssueSize	Bond issuance amount in billion RMB	CSMAR
Chengtou	Dummy that euqals one if the bond is labeled as chengtou bond and zero otherwise	WIND
Exch	Dummy that euqals one if the bond is traded in an exchange and zero otherwise	CSMAR
Price	Daily closing price of bonds	CSMAR
Spread	Yield to maturity of bonds minus the correspond risk-free rate, measured by China Development Bank bond (CDB) yields	CSMAR
TradeVol	Daily trading volume of a bond in million RMB	CSMAR
Duration	Duration of a bond	CSMAR
Rating	Implicit rating of a bond in numerical term by assigning 1 to AAA, 2 to AA+, 3 to AA, 4 to AA-, and so on	WIND
Haircut	One minus the conversion rate	CSDC
Panel B: Firm Characteristic		
List	Dummy that euqals one if the firm is a listed firm and zero otherwise	CSMAR
CSOE	Dummy that euqals one if the firm is controlled by central government and zero otherwise	WIND
Lev	The quarterly leverage ratio of the firm	WIND
ROE	The quarterly return to equity of the firm	WIND
Panel C: Local Government Financial Condition		
GDP	The gross domestic product of a province in billion RMB	NBS
Annual Revenue	The total annual revenue of local government in billion RMB	NBS
Annual Expenditure	The total annual expenditure of local government in billion RMB	NBS
Total Debt	The total outstanding debt of local government in billion RMB, including general debt and special debt	The Ministry of Finance