



Policy signals, credibility and market expectations: Evidence from the Chinese bond market

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ABSTRACT

Based on Chinese bond market transaction data, we study the effects of the Chinese Zeroing Hidden Debt (ZHD) policy on non-pilot regions in 2021 from a market guarantee expectations viewpoint. We find that the market selectively believes more in the bailout signal released by the ZHD pilot than in no-bailout signal, leading to an increase in implicit guarantee expectations instead of a decrease, which is contrary to the original policy intention. And it also has the heterogeneity of this selective belief psychology. We reveal that the market's trust in policy signals distorts policy effects.

1. Introduction

There is basically a consensus that policy signals promote policy objectives by guiding market expectations, and scholars have come to focus on the market expectations guiding the role of government bailout policies (O'Hara and Shaw, 1990; Cabrera et al., 2016; Cooper and Nikolov, 2018). However, the effectiveness of achieving policy objectives is also affected by markets' credibility (Goodspeed, 2002; Allers, 2015; Feld et al., 2017; Cooper and Nikolov, 2018). For example, signals of government bailouts may reinforce markets' bailout expectations instead of weakening the mitigation effect of risk (Cabrera et al., 2016).

In the case of China, the government's use of explicit and implicit debt swaps (the local governments issue bonds to replace implicit debts that are not legally recognized but which the government is obligated to repay) as a debt resolution measure sends a bailout signal, contrary to the stated non-bailout purpose of debt workouts. Little attention has been paid in literatures to changes in market expectations in response to multiple policy signals. We try to analyze the change in market expectations under multiple signals that include both bailout and no-bailout, which in fact reflects the extent to which the market believes in different signals.

We reveal that the market credibility of different signals affects policy effects. We assess the spillover effects of the China's Zeroing Hidden Debt (ZHD) pilot policy based on daily trading data from the bond market. We focused on non-pilot districts, because the pilot provinces were not randomly selected for their high economic strength and low debt risk. Thus, the spillover effects of the policy's purported non-bailout to non-pilot areas may be even more important. Through empirical tests, we find that the market expects more guarantees for high-debt areas' LGFV bonds (which are issued by local government financing vehicle companies) after the policy signals of "no-bailout" and "bailout" from the ZHD pilot, which are issued by local government financing vehicle companies (LGFVs), reflecting the investors' greater confidence in bailout signals in high-debt-ratio areas and greater confidence in no-bailout signals in low-debt-ratio areas. This effect is different for bonds issued by different regions and different LGFVs.

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The remainder of this paper is organized as follows: [Section 2](#) presents China's ZHD pilot. [Section 3](#) introduces the data and empirical strategy. [Section 4](#) presents the empirical results, heterogeneity analysis, and robustness tests. Finally, [Section 5](#) concludes.

2. Debt governance and the ZHD pilot in China

Local governments in China have long had incentives to obtain development funds, and without the legal right to raise funds in the market before 2015, they relied on local government financing vehicle companies (LGFVs) to raise funds by issuing bonds and other means. Even after the new budget law in 2015 clearly defined it as illegal, this method did not stop completely. In order to prevent and control the hidden debt risks associated with such undisclosed, opaque, and unrestrained borrowing, China has embarked on a long process of implicit debt management. One of the most important tools is debt swaps that replace hidden debt with government bonds.

Starting in October 2021, China launched the ZHD pilot in strong financial regions with low debt risk, with the aim of declaring an outright no-bailout message by promoting the zeroing hidden debt. The pilot was launched in a high-profile manner, with a gradual expansion starting from low-debt-risk areas. The first pilots of the ZHD policy were launched in areas such as Guangdong, Shanghai, and Beijing province. Among them, Guangdong Province was the first to start, announcing the commencement of the pilot in a high-profile government executive meeting on October 9, 2021, and Shanghai also announced the commencement of the pilot in a high-profile manner 11 trading days later. The key tool of the ZHD pilot is to conduct debt swaps, which can be known from the disclosed use of the bonds and has been explicitly stated in public information by Shanghai's Minhang District (but one needs to look carefully to be informed). The second pilot began on December 17, 2021, in some counties and cities with low debt ratios.

The size of the signal effect is influenced by the interpretation of the signal receiver ([Jervis, 1976](#)). If a policy contains two signals that act in opposite directions, but the market believes the lower-intensity signal more, reflecting a selective belief mentality, there may be a situation where the market reaction turns out to be inconsistent with the expectations of the signal sender. As in the ZHD pilot, if the market believes that the high-profile "no-bailout" signal is less credible and the low-profile "bailout" signal is more credible, the market will be bailout-sensitive and no-bailout-insensitive. The asymmetric response to the two signals will cause the implicit guarantee expectation to be "easy to increase but difficult to decrease", which is contrary to the policy intention. As the factual changes in the implicit guarantee expectation of the market in [Table 1](#) shows, the market implicit guarantee expectations have increased after the ZHD policy.

Because of the large debt and income disparities across China's regions, there are differences in debt repayment pressures across regions. As a result, there are regional differences in the market's selective belief in "no-bailout" versus "bailout" signals, i.e., the market believes more in "bailout" signals for regions with high debt ratios. This is because it is difficult for regions with high debt ratios to resolve their hidden debts, even if they rely on central government's bailouts. Instead, regions with low debt ratios have much less difficulty resolving their debts. Therefore, the spillover effects (no-bailout) of the ZHD policy will have a greater impact on the low-debt regions, there may be no significant change, or less of an increase, in implicit guarantee expectations in low-debt-rate regions than in high-debt-rate regions.

3. Data and methodology

3.1. Data

The data we use are mainly daily trading data and regional indicators of the bond market, which are obtained from the Wind database. We set the sample within 40 trading days ex ante (August 7, 2021) to 50 trading days ex post (December 17, 2021) to exclude possible interference from other important policies on the policy effects of the ZHD pilot. Such as the "Guidance for Bank and Insurance Institutions to Further Improve the Prevention and Resolution of Local Government Hidden Debt" announced on August 6, 2021, and the second phase of the ZHD pilot opening on December 17, 2021.

We screen the sample for the purpose of the study as follows. First, we do not focus on ZHD pilot districts and bonds that contain special clauses, so we exclude them. Second, only LGFV bonds that existed before and after the ZHD pilot were retained. Third, the sample of bonds with a maturity of less than one year is excluded. Fourth, for bonds traded across markets, trading data from the brokerage channel is excluded. At the same time, we trim the continuity variable for bonds by 1% on both sides. The final sample consists of 8215 LGFV bonds and 44,616 transactions data. [Table 2](#) reports descriptive statistics for the main variables.

3.2. Methodology

LGFV bonds are corporate bonds with undervalued risk due to their special function of financing the government. Therefore, we estimate the credit spread relationship function of market-based corporate bonds, and obtain the implicit guarantee expectation from the difference between the actual and counterfactual credit spread of LGFV bonds. The estimated model of the credit spread is:

Table 1
Changes in average implicit guarantee expectations before and after the ZHD pilot.

Areas	Pre-event	Post-event	Direction of change	Scale of change
Pilot provinces	14.537	14.814	+	0.277
Non-pilot provinces	7.330	8.392	+	1.062

Table 2
Summary statistics.

Variable	Mean	S.D.	Min	Max
<i>Ige</i>	7.965	23.573	−16.712	165.130
<i>Post</i>	0.597	0.490	0	1
<i>Debt</i>	3.069	0.900	1.625	6.186
<i>log(Price)</i>	4.532	0.237	3.018	4.652
<i>Amihud</i>	0.077	0.566	0	11.762
<i>log(Remp)</i>	0.324	0.940	−2.764	1.928
<i>Speci</i>	0.505	0.499	0	1
<i>Rate</i>	0.052	0.013	0.026	0.08
<i>Timl</i>	3.788	2.170	0.47	10
<i>Log(Tofa)</i>	2.054	0.551	0.693	3.401
<i>log(Tai)</i>	7.907	1.585	0.035	10.886
<i>RHD</i>	0.009	0.094	0	1
<i>Nonst</i>	0.0001	0.012	0	1
<i>log(Rev)</i>	5.711	0.652	3.010	6.853
<i>log(Landtr)</i>	11.811	2.390	0	15.864

$$Spread_{it} = \phi_0 + \phi_1 Bonds_{it} + \phi_2 Issuer_i + \phi_3 Province_{it} + Area_i + \eta_t + \mu_{it} \quad (1)$$

where i represents the bond, t represents the date, $Spread_{it}$ represents the credit spreads for the non-LGFV bond, obtained by subtracting the yield to maturity of the corporate bond from the yield of a treasury bond with the same remaining maturity on the same date. $Bonds_{it}$ is the bond characteristics, including the daily closing price (*Price*), remaining maturity (*Remp*), illiquidity indicator (*Amihud*), transaction amount (*Tai*), $Issuer_i$ represents the inherent attributes at the time of bond issuance, including the presence of special terms (*Speci*), issue rate (*Rate*), maturity (*Timl*), and issue size (*Tofa*); $Province_{it}$ represents the province characteristics, including general public budget revenue (*Rev*), and monthly land transaction amount (*Landtr*). $Area_i$ represents the fixed effect of the bond's province of domicile; η_t represents the date fixed effect.

After the estimated coefficient of model (1) is obtained, the counterfactual credit spread of LGFV bonds is calculated, and the implicit guarantee expectation (*Ige*) is estimated by subtracting from the actual credit spread.

We also considered endogeneity. On the one hand, there is the "Settlement of Hidden Debts in Established Counties" policy, which was piloted in 2019, which is a pure bailout. This could lead to increased market expectations for implicit guarantees for LGFV bonds included in this pilot area. We add a dummy variable for the "Settlement of Hidden Debts in Established Counties" pilot to control for this. On the other hand, there are non-standard bond defaults such as trust loans, which may lead to an underestimation of the no-bailout effect of the ZHD pilot. We add a monthly dummy variable of the provincial non-standard defaults to control it.

We use a difference-in-difference specification to assess the impact of China's ZHD policy on implicit market guarantee expectations of non-pilot areas:

$$Ige_{it} = \beta_0 + \beta_1 Debt_i \times Post + \gamma_1 Bonds_{it} + \gamma_2 Province_{it} + \delta_i + \lambda_t + \varepsilon_{it} \quad (2)$$

where Ige_{it} denotes the implicit guarantee expectation; $Debt_i$ denotes the government debt rate of the province to which bond i issuer belongs in 2020; *Post* is a dummy variable that is 1 if the bond transaction date t is after the ZHD policy and 0 otherwise. The $\delta_{iand}\lambda_t$ represents the bonds fixed effect and date fixed effect.

4. Empirical results

4.1. Baseline results

The regression results of model (2) are reported in Table 3. The coefficient of $Post \times Debt$ is positive and significant at the 1% level. This suggests that the implicit guarantee expectation of LGFV bonds in high-debt-rate regions increases more after the ZHD policy pilot, reflecting the market's greater response to the "bailout" signal to high-debt regions, which means that it is more selective belief in bailouts.¹

4.2. Robustness tests

4.2.1. Parallel trend test

We followed Beck et al. (2010) and used an event study approach for parallel trend testing to construct the following model:

¹ The wooldridge test for autocorrelation confirms the conclusion that there is no serial correlation, and Poolability and Hausman test prove that the Two-way fixed effects model is more suitable.

Table 3
Spillover effects of the ZHD pilot.

	(1)	(2)
<i>Post</i> × <i>Debt</i>	0.053*** (0.017)	0.062*** (0.017)
Bonds FE	Yes	Yes
Date FE	No	Yes
Adj. R ²	0.999	0.999
Observations	44,616	44,616

Notes: All regressions include a set of bonds dummies and date dummies. Standard errors are clustered at the bonds level (mitigating cross-sectional correlation), and reported in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

$$Ige_{it} = \alpha_0 + \alpha_1 \sum_{r=-8}^{r=10} Debt_i \times Post_r + \theta_1 Bonds_{it} + \theta_2 Province_{it} + \delta_i + \lambda_t + \varepsilon_{it} \quad (3)$$

where r represents the relative time in 5-trading-day intervals. Specifically, if the policy release date is m . If the bond trading day is in the time period $[m+5k, m+5k+4]$, then r equals k . For example, in the time period $[m-5, m-1]$, r equals -1 . $Post_r$ is a group of fake ZHD pilot dummy variables.

As can be seen in Fig. 1, each estimated coefficient is insignificant at the 95% confidence level before the ZHD pilot, and the parallel trend test is valid.

4.2.2. Causality tests

We randomly disrupted the data on the debt rate for each province, tested it using model (2), and repeated the process 500 times. As can be seen in Fig. 2, the mean value of the coefficients under the random process is close to zero, while the actual coefficient of the real treatment variable (0.062) is in the high tail of the distribution of the "pseudo" estimated coefficients, which excludes the possibility that randomness could lead us to find the baseline regression results.

4.2.3. Alternative measure of indebtedness degree

The debt ratios in the baseline regression are broad debt ratios. We re-ran the model using narrow debt indicators: implicit debt scale, $Debt_S$, and the implicit debt ratio, $Debt_I$. As shown in columns (1) and (2) of Table 4, the estimated coefficient of $Post \times Debt$ is still positively significant.

4.2.4. Exclusion of other policies that may affect the results

The sample interval for the baseline regression includes the event when other province, Shanghai, announced the start of the pilot. We carried out regression on the samples before the pilot in Shanghai, the results are shown in column (3) of Table 4. In addition, we further include the cross fixed effect of province and month to control the time-varying of province, the results are shown in column (4) of Table 4. The estimated coefficients of $Post \times Debt$ remain positively significant in both cases.

4.3. Heterogeneity analysis of credibility

We divide the sample by province and bond characteristics for heterogeneity analysis. First, we divide the sample into higher and lower by fiscal self-sufficiency ratio (FSR, the ratio of local public revenue to expenditure) and financing dependence (FD, the ratio of the hidden debt to the broad debt by province), using 50% as the criterion. The regression results are shown in Panel A of Table 5. Moreover, we divide the sample by the administrative level of the issuer and the credit rating of the bond, the regression results are shown in Panel B of Table 5. The empirical results show that the ZHD policy has a significant impact on bonds issued by provinces with low fiscal self-sufficiency and high financing dependence, as well as bonds issued by LGFVs above county levels, and with credit ratings of AAA, which means that at this point investors are more asymmetrically reflective of no bailout and bailout, reflecting their greater selective belief.

5. Conclusion

We extend the current research on policy signals and market expectations by examining the spillover effects of the Zeroing Hidden Debt (ZHD) policy using Chinese bond market trading data. We find instructive findings that the ZHD policy contains both "no-bailout" and "bailout" signals, but the market believes more in the latter, and that this selective belief is not uniform across bonds. The effects of policies are influenced not only by their content but also by the expectations generated by market credibility. The "soft market constraint" in the LGFV bond market may be one of the reasons why the size of China's hidden debt is "easy to increase but difficult to reduce".

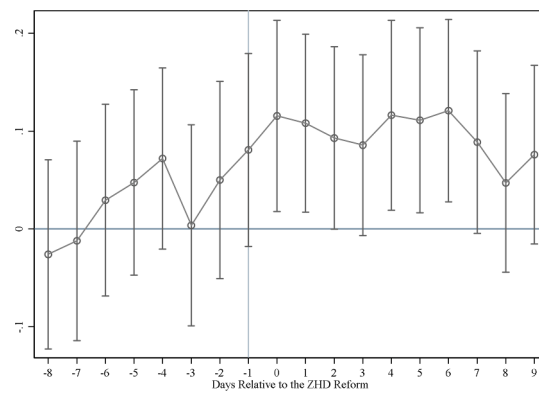


Fig. 1. Parallel trend test.

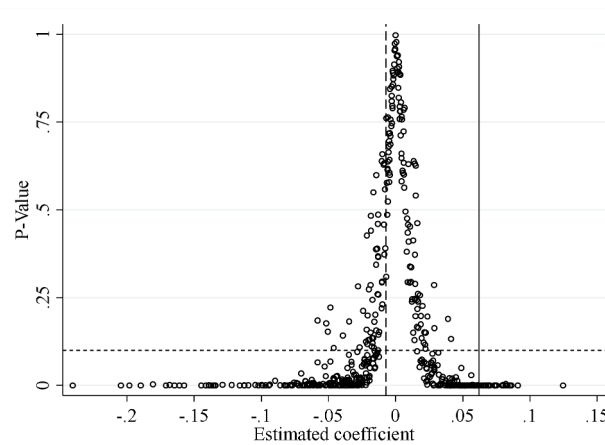


Fig. 2. Placebo test.

Table 4
Other robustness test.

	(1)	(2)	(3)	(4)
$Post \times Debt_S$	0.038*** (0.006)			
$Post \times Debt_I$		0.129*** (0.024)		
$Post \times Debt$			0.046** (0.018)	0.038* (0.020)
Constant	437.201*** (3.914)	437.328*** (3.925)	424.401*** (7.858)	437.328*** (3.932)
Bonds Controls	Yes	Yes	Yes	Yes
Province Controls	Yes	Yes	Yes	Yes
Bonds FE	Yes	Yes	Yes	Yes
Date FE	Yes	Yes	Yes	Yes
Adj. R^2	0.998	0.998	0.998	0.999
Observations	44,616	44,616	22,313	44,616

Notes: All regressions include a set of bonds dummies and date dummies. Standard errors are clustered at the bonds level and reported in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

CRedit authorship contribution statement

Na Li: Conceptualization, Funding acquisition, Supervision, Writing – original draft, Writing – review & editing. **Meile Feng:** Validation, Formal analysis, Software, Data curation, Conceptualization, Methodology, Visualization, Writing – original draft, Writing – review & editing. **Rong Liu:** Conceptualization, Supervision, Writing – review & editing, Funding acquisition.

Table 5
Heterogeneity analysis.

Panel A: Provincial characteristics				
	(1) Higher FSR	(2) Lower FSR	(3) Higher FD	(4) Lower FD
<i>Post × Debt</i>	0.003 (0.022)	0.059** (0.027)	0.051*** (0.017)	0.041 (0.193)
Adj. R ²	0.999	0.998	0.999	0.998
Observations	22,714	21,902	43,252	1363
Panel B: Issuer characteristics				
	(1) County	(2) Above-county	(3) A&AA	(4) AAA
<i>Post × Debt</i>	−0.023 (0.155)	0.062*** (0.017)	0.045 (0.029)	0.072*** (0.027)
Adj. R ²	0.860	0.999	0.999	0.999
Observations	937	43,676	16,341	9107

Notes: All regressions include a set of bond dummies and date dummies, as well as bond and province characteristics variables. Standard errors are clustered at the bond level and reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Panels A and B show the subsample regressions for different provinces and bond characteristics, respectively.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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