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Is Gradualism a Credible Commitment to Enhance Bond Market Discipline Toward State-Owned Enterprises in China?

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The Impact of Gradualism in Enhancing Bond Market Discipline Towards state-Owned Enterprises in CHINA

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Abstract: This study investigates whether market discipline on Chinese state-owned enterprises (SOEs) improved after the default wave of SOE bonds in 2020. We use Flannery's classical definition of two-side market discipline, market monitoring and market influencing, as the criteria to measure the credibility of the gradual marketization reform. Using secondary market corporate bond transactions' dynamic panel data with the SYS-GMM estimator, we find that investors actively monitored the risk profile of bond issuers before 2020, and the monitoring effect is enhanced as investors become more sensitive to the default risk of bond issuers. Our results reveal that bond market discipline is more pronounced in economically developed regions but less in systematically important industries. We also note that no-bailout cases of SOEs in a province surprisingly do not induce other SOEs in the province to take more risks, which suggests a lack of market discipline on the risk-taking of SOEs before the reform; the effect is reversed after 2020. Overall, the gradualism strategy of the Chinese central government has improved market discipline towards SOEs in some respects. Our findings support several policy implications for further enhancing market discipline and regulating risk-taking by SOEs.

Keywords: Market Discipline; Chinese Corporate Bonds; State-owned enterprises; Too-big-to-fail; Soft-budget theory; Big bang approach

1. Introduction

International evidence suggests a lack of bond market discipline in state-owned enterprises (SOEs) debts because of the implicit government guarantee and the 'too big to fail' philosophy (Tsafack et al., 2021). For example, the International Monetary Fund (IMF) and prominent economists have accused Chinese local governments and state-owned financial institutions of not holding SOEs accountable for their risk-taking actions (Ning et al., 2019). SOEs enjoy ubiquitous funding advantages not only in transition economies but also in developed economies such as the European Union (Olschewski et al., 2023) and the U.S. (Borisova et al., 2015). Bond buyers may expect that if an SOE defaults, there is an implicit guarantee from the Treasury. Since SOEs are still very important in today's international bond market, this kind of implicit guarantee could give SOEs an unfair advantage and make it harder for non-SOEs to compete in international trade. That is why it is important for the international financial markets to enforce market discipline on SOEs (Jara-Bertin et al., 2015).

The literature shows that the structure of SOEs can disrupt their corporate strategy in a variety of ways. SOE managers have to coordinate with the government's social and political objectives, which sometimes weigh more than the target of profit maximization (Cong Phuong et al., 2020). The government transfers its own social and political functions to SOEs (such as public infrastructure, alleviating the fiscal burden, and expanding employment). SOE executives have always been assigned by the government, with their remuneration and rewards strictly controlled by the government and having little to do with the performance of SOEs (Su et al., 2020). Such agency problems reduce the incentive for SOE managers to improve enterprise performance. The

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government provides explicit financial support and implicit debt guarantees to SOEs as compensation, which leads to the problem of soft budget constraints and low efficiency in the state sector (Kornai et al., 2003).

The Chinese economy is characterized by both a high number of state-owned firms and dominant state-owned banks. Such a structure makes the financial system more susceptible to the soft-budget constraint problem (Ning et al., 2019). The frequent government bailouts of the state sector have distorted the capital market, crowded out investment for enterprises in the more productive private sector, and caused excessive leverage in the state sector. The affiliated contingent liability issue risks public finance (Tsafack et al., 2021). Recently, the decline in financial efficiency, the deceleration of economic growth, and the rise of financial crises have prompted the central government to enhance market discipline for corporate and financial institutions (Y. Huang & Wang, 2017). Since 2014, Chinese regulators have launched a series of gradual, market-oriented reforms in its debt markets to improve capital market efficiency, e.g., the no-bailout reform (Mo et al., 2021). After that, bond defaults became more frequent, and they rattled market expectations of bailouts. However, before 2020, the main defaulters were POEs (private-owned enterprises); this unbalanced performance in terms of bond defaults exacerbated the bond market distortion because more capital flew to the state sector (Ge et al., 2020). More recently, the global pandemic and deteriorating local-government fiscal conditions have accelerated the no-bailout reform and affected more SOEs. SOEs' bond defaults surged to a historically high level in 2020, which shocked many investors who long believed the government would bail out distressed SOEs. Increasing defaults by SOEs highlighted the tightening of credit conditions and a growing reluctance of regional governments to bail out troubled SOEs (Murugaboopathy & Galbriath, 2021). Meanwhile, the Chinese central government has consistently signaled the importance of weakening the implicit guarantee to the state sector and enhancing bond market discipline (T. Huang, 2021). *Can changes in the regulatory and institutional environment alter market expectations for implicit guarantees and enhance the bond market discipline toward SOEs?*

To answer this question, we investigate whether investors and issuers in China view the gradualism strategy as a credible commitment. We compare the strength of the market monitoring effect and the market influencing effect on SOEs before and after 2020. We focus solely on the bonds issued by L-SOEs (listed local government-owned enterprises) since the central government-owned enterprises directly supported by the central government are less likely to be affected by the market environment (R. Zhang et al., 2022).

China provides a unique study setting because it is the largest transition economy with the largest body of SOEs in the debt market. SOEs in China have recently experienced several regulatory and institutional changes in the capital market, including the deleveraging reform in 2015, the gradual no-bailout reform since 2014, the recent global COVID-19 pandemic, and the real estate crisis, all of which limited the local government's capacity to support SOEs (T. Huang, 2021). We test the monitoring hypothesis that creditors who believe their funds are at risk will actively monitor the borrowers and take action to protect themselves by charging a higher premium. Therefore, corporate bond market investors should understand firms' risks and price them correctly in securities prices (Bliss & Flannery, 2001). Such a market mechanism can potentially constrain the risk-taking of borrowers (Bennett et al., 2015). We test the influence hypothesis that borrowers reduce future risk-taking following market risk signals [e.g., credit events of similar enterprises and regulatory fines] (Schaeck et al., 2012).

Our results indicate that, before the SOEs' default wave in 2020, the market monitoring effect persisted because investors rationally priced the default risk of bond issuers and acted appropriately to the change in default risk. The market monitoring effect was further enhanced after 2020 when investors attached greater importance and became more sensitive to the default risk of bonds. We also notice that the central government's industrial policy and local economic development level have important impacts on the evolution of market discipline. For the market-influencing effect, our results show that SOEs' default in a region failed to discipline the strategic risk-taking of SOEs in the same

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region before 2020. However, this reversed after 2020. Overall, our results indicate an improvement in market discipline in Chinese corporate bond markets towards SOEs.

This study contributes to the literature in several ways. First, the study enriches research on the soft budge theory. Over a quarter of a century has passed since the fall of the Berlin Wall; academic discussion regarding transition strategies has continued, but there is no sign of convergence (Iwasaki & Suzuki, 2016). At present, most relevant studies focus on the relationship between macroeconomic performance and the speed of reform (Dell'Anno & Villa, 2013). Little attention has been paid to reforming soft budget problems at the micro-enterprise level. As indicated by Kornai et al. (2003), one of the most important issues in the reform of SOEs is to guarantee the hardening of budget constraints and the enforcement of market discipline. This study adds to what has already been written using the classic two-side market mechanism, which includes market monitoring and market influencing from the market discipline theory, to test the gradual marketization reform in the Chinese corporate bond market. We add the soft budget theory to the market discipline theory to make it more complete. We provide comprehensive tools for policymakers in other transition economies, such as Vietnam and Russia, to design reform packages to improve credit market discipline. Secondly, this study enriches the recent stream of studies on the gradual marketization reform in the Chinese corporate bond market. In 2014, Chinese regulators began allowing bonds to default, to weaken the implicit guarantee and enforce bond market discipline on a slow path. Mo et al. (2021) document the surprising worsening inflation problem in the credit rating industries. Jin et al. (2018) find negative abnormal returns on SOE bonds in response to a default event. R. Zhang et al. (2022) document an increase in investors' sensitivity to default risk. However, these studies examined the impact of the no-bailout event on the overall bond market. The institutional and regulatory environment towards SOEs and POEs largely differs from that (Y. Li et al., 2020).

Our study fills the research gap by focusing solely on the local-government-owned SOEs (L-SOEs). We find improvements in market monitoring and market influencing effects after 2020, and we notice the persistence of the 'too big to fail' expectation. Our study not only helps Chinese regulators assess the effectiveness of the reform but also aids international investors in better understanding the current institutional and regulatory changes in the Chinese corporate bond market. This study also adds to the empirical literature on market discipline theory. Most studies address this topic in financial institutions in mature economies (Hasan et al., 2013). Little attention has been paid to emerging markets and non-banking enterprises. State-owned enterprises, because of their strategically important statutes and 'too big to fail' philosophy, enjoy similar funding advantages as large financial institutions in developed financial markets (Ning et al., 2019, p. 13). Bond market discipline towards SOEs is important to guarantee fair competition in international trade but has received little academic attention (Jara-Bertin et al., 2015). We fill this gap by empirically exploring bond market discipline in the largest transition economy. Our study avoids an important bias in research on market discipline theory, as indicated by Flannery and Bliss (2019). Most studies on market discipline have been based on one side of market discipline, the monitoring effect, but ignored the market-influencing effect. We provide evidence of SOEs' bond market discipline from both the investor (market monitoring) and issuer side (influencing).

The rest of the paper is organized as follows: Section 2 provides a brief overview of the study's institutional environment. Section 3 presents the literature review for this study and develops the research hypotheses. Section 4 describes the sample and empirical methods. Section 5 reports the empirical findings. Section 6 concludes the paper.

1.1. Institutional Background

1.1.1. The Development of the Chinese Corporate Bond Market

China has a bank-dominated financial system. According to the Chinese central bank, in 2021, the banking sector accounted for 63.6% of the aggregate financing of the real economy. However, the over-concentration of debt in the banking system has worried policymakers. Over the past decade, China has taken enormous strides to develop its bond markets as an integral part of financial reforms.

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Chinese bond market capitalization scaled by GDP rose from 35% in 2008 to almost 100% in 2019; in comparison, the U.S. bond market has remained slightly above 200% of the U.S. GDP during the same period (Chen & Shen, 2023).

The corporate bond market in China started late but has grown fast recently, especially after the Chinese government allowed a more market-oriented registration-based regime in 2015 to replace the traditional approval-based regime in bond issuance (Gu et al., 2021). The Chinese bond market had a volume of US$13.2 trillion and has been ranked as the second-largest bond market in the world since 2019 (George, 2019). However, the infrastructure and regulation of the Chinese corporate bond market are still nascent compared with developed financial markets. This includes weak information disclosure and lack of transparency;-fewer varieties of bonds; poor liquidity; a low degree of market discipline (Y. Huang & Wang, 2017); and market segmentation (Schweizer et al., 2023). Apart from the factors mentioned above, what makes the Chinese corporate bond market different from a developed market is frequent government intervention and an implicit guarantee by the state sector (Ning et al., 2019).

Chinese local governments have a long tradition of providing support and bailouts to SOEs in the corporate bond market. The lack of fiscal and market discipline for the state sector worries policymakers in the central government because the contingent liabilities of China's state enterprises have been viewed as a systematic threat to local government's fiscal conditions (Ning et al., 2019). Scholars and financial institutions are concerned about the sustainability of the SOEs' borrowing since many SOEs in China are still subject to the SBC (soft budget constraints) problem and they are not capable of repaying their debts without financial support from government. Frequent government intervention in the bond market has distorted the market and raised the state sector's moral hazard and excessive leverage problem (X. Huang et al., 2022). It crowds out investment from the productive private sector (R. Zhang et al., 2022). The contingent liability problem risks public finance and financial stability since commercial banks are China's main investors in SOE debt. The accumulation of capital resources in the state sector has also dragged down the country's overall economic growth. As the economy experienced a downturn following the COVID-19 pandemic crisis and the trade conflict with the U.S., the fiscal condition of local government has raised concerns among scholars and international rating agencies (S&P Global, 2024). The recent crisis in the real estate industry has exacerbated the problem since selling land is a major source of tax revenue for many local governments, and their capacity to support SOEs remains questionable.

1.1.2. The Gradual No-Bailout Reform and the SOE's Default Wave in 2020

Frequent government intervention has hampered the functioning of the Chinese bond market and increased instability in the financial system. Since 2015, the Chinese central government has had a series of gradual market-oriented reforms to weaken the implicit guarantee to the state-sector: the no-bailout reform (Mo et al., 2021). Bond defaults in China are not new, but previously, they have affected mostly private businesses; over 80 percent of defaults from 2017 to 2019 were from private firms. However, the situation has changed. In 2020, the share of state firms in bond defaults almost matched that of private enterprises, with state firms defaulting on 80 bonds worth RMB98 billion (US$15.17 billion). The default wave of SOEs in 2020 broke investors' trust in local governments' blanket support of local SOEs. On the one hand, governments at all levels in China faced the worst fiscal stress after the COVID-19 pandemic. On the other hand, Beijing was attempting to signal to all credit market participants that "too big to fail" was no longer held and intended to allow more ill-managed state firms to default on their bonds (T. Huang, 2021). The acceleration of SOEs' bond defaults and deterioration in local government fiscal conditions challenged the long-standing golden rule of an implicit government guarantee (Lo, 2020).

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2. Literature Review and Hypothesis Development

2.1. Gradualism Versus Big Bang in the Soft Budget Theory

In centrally planned economies, economic growth is slowed by a number of issues, including a soft budget problem that leads to a lack of consumer goods (Kornai, 1979), failure to come up with new projects (Qian & Roland, 1998), employees not motivated, and businesses not working as efficiently as they could (Aghion & Blanchard, 1994). There is little debate on whether market reform in central-planed economies is needed; the debate is instead on the appropriate speed of such reform (Katz & Owen, 2000), which leads to the debate between 'big bang' and 'gradualism' (What is the most appropriate speed of market reform?).

The 'big bang' approach supports a simultaneous introduction of all market reforms that aim at delivering definite efficiency gains in introducing a successful market economy (Roland, 2000). This approach reflects that the speedy implementation of policy packages is indispensable for establishing a market economy in former socialist economies (Iwasaki & Suzuki, 2016). The gradualism approach proposes a moderate path that relies on the flexibility of experimentation with an adequate sequencing of reforms (Aghion & Blanchard, 1994). These proponents assert that the transition to a market economy should be carried forward over time so that any social downfall can be avoided and can consider the necessity of effectively controlling the side effects of structural reforms, such as political and social unrest (Kornai, 1994). Policymakers face a trade-off between the short-term reverse cost (e.g., a drop in employment and production) and long-term economic improvement when deciding on reform policies.

After the disintegration of the Soviet Union, several centrally planned economies went through a transition phase to replace the traditional, centrally planned system with private property and market mechanisms; the speeds and corresponding outcomes differed (W. N. Li, 1998). For example, gradualism succeeded in China and Hungary but failed in Ukraine, whereas shock therapy succeeded in Czechoslovakia and Poland but failed in Russia (Borshchevska, 2015; Kazakevitch & Smyth, 2005). Thus, it is difficult to conclude which reform is superior. Popov (2000) highlights that the initial conditions, such as the level of economic development, disproportions in industrial structure, and the trade patterns, play more important roles than the speed of liberalization in explaining different post-transition performance. Iwasaki and Suzuki (2016) reviewed 137 previous studies and concluded that one main reason there is still no agreement on post-economic performance is that there are no clear differences between countries that have implemented radical policy guidance for economic transition and countries that have implemented gradualism structural reform.

One main argument for the gradualism approach is the problem of time consistency and credibility; moving too slowly and the consensus supporting the reform can collapse. The uncertainty endangers any reform program and casts doubt on the government's credibility in carrying it out (Macesich, 1991). Chinese regulators adopted a gradualist approach to reform the soft budget problem in its state sector, which means that the government selectively supported strategically important enterprises and let go of the others (T. Huang, 2021). We explore whether such a gradualism strategy is a credible commitment for investors and bond issuers.

2.2. The Market Discipline Theory

The theory of market discipline, which generally asserts that self-interested creditors can provide substantial assistance in reigning in the risk-taking of borrowers. It has also been a foundation principle of bank prudential regulation since the late 1980s (Min, 2015). The theory initially examined the conditions under which the market can compel unsustainable borrowing (Lane, 1991).

Early studies mainly focused on the conceptual definition and empirical evidence of such market mechanisms. Robinson et al. (1967) describe market discipline as a crucial market mechanism that protects banks from profit-maximizing behavior, enabling them to obtain uniquely optimal leverage. According to De Ceuster and Masschelein (2003), market discipline is a regulatory mechanism that

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delegates monitoring and disciplining to market participants whose wealth is affected by banks' actions. The most comprehensive definition was proposed by Bliss and Flannery (2001), as a two-sided market mechanism that includes market monitoring and market influencing. The former refers to the hypothesis that investors accurately evaluate changes in a firm's condition and incorporate those assessments promptly into the firm's security prices, whereas the latter refers to how market information translates into incentives for managers to alter risk-taking behavior.

Empirical studies mainly investigate whether a riskier borrower is punished with higher funding costs or lower funding capacity in the capital market. For instance, Sironi (2003) finds that investors can rationally discriminate between the different stand-alone risk profiles of banks in the Eurozone. Opiela (2004) has a similar conclusion about Thailand's banking system. Nier and Baumann (2006) indicate that strong market discipline forces banks to hold a higher capital buffer and limit their risk-taking in the U.S. Yeyati et al. (2004) state that in the Latin American financial markets, depositors' discipline riskier banks by withdrawing deposits and requiring higher deposit rates.

The 2008 global financial crisis triggered a series of public rescues in financial systems. Clearly, market discipline failed to prevent the buildup of bank risk that caused the financial crisis (Min, 2015). Governments and researchers started reconsidering the failure of market discipline and its link to the 2008 global financial crisis. For instance, Stephanou (2010) suggests that market discipline failed to exert itself sufficiently early to prevent the buildup of systemic crises because of a lack of information disclosure and market transparency. Min (2015) blames the sophisticated shadow banking system on weakening market discipline. Anginer et al. (2014) highlight that an explicit financial safety net (deposit insurance) can reduce the incentive for depositors to monitor banks, which leads to excessive risk-taking. It also increases the financial system's systematic fragility. Several studies attribute the failure of market discipline to the implicit government guarantee and 'too big to fail' philosophy (Schich & Aydin, 2014; Tsafack et al., 2021). The expectation that an organization will provide a bailout to creditors without any ex-ante commitment is an implicit guarantee (Schich & Aydin, 2014). An institution that can count on a bailout by another organization receives an advantage in debt pricing compared with those that cannot (Schich & Aydin, 2014). Investors can perceive such an implicit bailout probability and will act accordingly, reducing the incentive to monitor and control the risk-taking of borrowers (Hett & Schmidt, 2017). In general, the bailout philosophy has several effects on bonds, such as: (a) a higher bond rating (Ge et al., 2020; R. Zhang et al., 2022); (b) lower funding cost (Schich & Aydin, 2014; R. Zhang et al., 2022); (c) lower risk-yield sensitivity (Hett & Schmidt, 2017); and (d) lower CDS premium volatility (Acharya et al., 2022).

The 2008 global financial crisis exposed important limitations of market discipline and cast doubt on the underlying premise of efficient markets as a prudential mechanism (Constantinos, 2010). It also resulted in a series of public bailouts for large financial institutions, with huge costs to public finance. The public bailout stabilized the financial system in the short run but exacerbated the issues that pushed the financial system to the brink of collapse in the first place: low market discipline, too-big-to-fail, excessive risk-taking, and the bank-sovereign nexus (Acharya et al., 2017; Brunnermeier et al., 2016; Dam & Koetter, 2012; Giuliana, 2022; Laeven & Levine, 2009). Correspondingly, the European Parliament and the U.S. Congress issued new regulations on government spending on bailing out financial institutions (the Banking Recovery and Resolution Directive and the Dodd-Frank Act). Several studies then focused on the reconstruction of market discipline under the regulatory changes. This stream of research provides a guide on how to detect the improved market discipline.

As the bailout expectation decreases, investors should pay more attention to monitoring the risk profile of bond issuers (Balasubramnian & Cyree, 2014), which will break the bank-sovereign risk transmission channel reflected in the co-movement in the banks' CDS premium and sovereign bonds CDS premium (Lamers et al., 2024). This results in the repricing of bonds, particularly those that mature after the auction policy (Cutura, 2021). Repricing will eventually discipline banks to reduce their risk-taking (Giuliana, 2022).

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2.3. Hypothesis Development

This study explores whether the gradual approach can improve the market discipline of SOEs in the Chinese corporate bond market. Gradualism, by definition, refers to the fact that the Chinese government did not announce an immediate no-bailout policy but has taken a more gradual path. Government bailouts will likely continue, especially for companies viewed as strategically important for the national goal of self-reliance in certain cutting-edge technologies (T. Huang, 2021; Mo et al., 2021). In 2015, the central government issued the SOE reform plan that asserts that SOEs are responsible for their own profits and losses and must bear their own risks (Cheng et al., 2021). Several new policies started to tighten local government's spending on paying the debt issued by SOEs (Ministry of Finance, n.d.). Beijing signaled a gradual retreat from government guarantees on state firm liabilities from 2017, and several local governments, struggling with their own fiscal deficits and implicit state guarantees in the credit market going forward, became doubtful (T. Huang, 2021; Y. Huang & Wang, 2017).

We investigate the impact of the gradual reform on the Chinese corporate bond market through a series of unexpected defaults of bonds issued by SOEs in 2020, i.e., the default wave of SOEs. We use 2020 as the cut-off point because, before then, defaults by SOEs were relatively rare compared with POEs. Since China launched a massive deleveraging campaign in 2015 to curb excessive borrowing by local governments, financial institutions, and businesses, private companies' credit risks have been fully exposed (Juanjuan et al., 2020). In 2020, several large SOE defaults triggered investor concerns about the entire corporate bond market because they broke the long-held assumption about an implicit government guarantee for SOE bonds. We thus view 2020 as an acceleration point of the no-bailout reform and explore whether market discipline was enhanced. Intuitively, according to Y. Huang and Wang (2017), if there is no sign of improvement in market discipline in such an environment, it implies that the government needs to take a faster reform strategy to enforce the sustainability of SOEs. We follow the conceptual definition proposed by Lewrick et al. (2019) and Bliss and Flannery (2001) and empirical methods applied in the studies by Distinguin et al. (2012), Baele et al. (2014), Balasubramnian and Cyree (2014). If the no-bailout reform for SOEs is seen as a real promise, investors will have a stronger reason to watch SOEs' default risk, and they will become more aware of how much risk SOE bond issuers are taking. Thus, we proposed the following relationships:

H1: Corporate bond investors attach higher importance to the credit risk measure of bond issuers after 2020.

H2: Corporate bond investors become more sensitive to the risk-taking of bond issuers after 2020.

The study by Flannery and Bliss (2019) shows that both the monitoring and influencing effects are necessary for market discipline to work. The study also points out a major research gap: most studies look at only the monitoring effect whereas some (Baele et al., 2014; Distinguin et al., 2012), look at the influence effect on how managers react to signals from the capital market that prices were falling. If the financial market can effectively influence bond issuers, credit events should prompt them to adopt stricter future risk management practices (Gao et al., 2020).

To come to a conclusion about how strong market discipline is in the Chinese corporate bond market, we first look at the evidence of influencing effects. We check to see if risk signals (bond defaults by SOEs in the same region) make other SOEs less willing to take risks. In the second step, we explore whether the default of bonds issued by SOEs in 2020 enhanced such a market influence effect. Thus, we proposed the following relationships:

H3: SOEs defaulting on bonds in the same region, causes other SOEs to take less risk.

H4: SOE managers respond more actively to market risk signals after 2020.

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3. Data and Methodology

3.1. Market Monitoring

Market monitoring is the ability of security holders to accurately assess the condition of the firm. Investors need to understand changes in a firm's risk profile correctly and, in a timely manner, incorporate those assessments into the firm's security price. Specifically, creditors who believe their funds are at risk should actively monitor the borrower and take action to protect themselves. The empirical strategy of the monitoring effect is thus to explore the first and second derivatives of bond yield to the risk profile of corporate bond issuer. As a firm's perceived risk increases, holders of the firm's uninsured liabilities will require a higher promised return to compensate for higher expected losses (Flannery & Nikolova, 2004). The empirical models are given as:

$$Ys_{itj} = \beta_1 Ys_{it-1} + \beta_2 Risk_{it-1} + +\beta_3 size_{it-1} + Controls + \varepsilon_{it} + \omega_i \quad (1)$$

$$Ys_{itj} = \beta_1 Ys_{it-1} + \beta_2 Risk_{it-1} + \beta_3 post * Risk_{it-1} + \beta_4 post * size_{it-1} + Controls + \varepsilon_{it} + \omega_i \quad (2)$$

where: Ys_{itj} is the credit spread of bond i issued by enterprise j in quarter t, and credit spread is calculated as the difference between the yield to maturity of the bond and yield of the treasury bond with the same time to maturity. Risk is the KMV's distance to default, a reverse proxy of default risk; the higher the distance to default, the lower the default risk (Bharath & Shumway, 2008). Post is a dummy variable equal to one for bonds issued after 2020 and 0 otherwise. Following previous studies on the Chinese corporate bond market (Mo et al., 2021; R. Zhang et al., 2022), we control for a series of bond characteristic variables and firm financial variables, such as the issuance size, time to maturity, return on equity, the market to book ratio, the current ratio, the leverage ratio, the logged value of the total asset and the sale growth. We also include the quarterly GDP growth rate and M2 size to control the impacts of the macro-economic conditions on bond yields. The descriptive statistics of the study variables are presented in Table 1, where L means the variable is lagged by one quarter; ω_i is an unobservable bank-specific effect, which is assumed to be constant over time, and ε_{it} is the white noise error term.

Equation (1) is the baseline regression to test the presence of market discipline in the Chinese corporate bond market; market discipline can be shown from the positive impact of a firm's default risk on the credit spread (Bliss & Flannery, 2001). In this study, we observe a negative β_2 in equation (1) since the KMV's distance to default is a reverse proxy of default risk. The market expectation of 'too big to fail' can be tested from the negative impact of firm size on the credit spread (Balasubramnian & Cyree, 2014).

To test whether the market monitoring effect is enhanced after 2020, we introduce the interaction terms of post and risk into equation (1). According to Hadad et al. (2011), market discipline improves when the dummy interaction with default risk shows a statistically negative sign (indicating that the default risk becomes more pronounced in explaining the yield spread). We also introduce the interaction term of post and size into equation (1). Following the definition by Balasubramnian and Cyree (2014), improved market discipline can be drawn from a positive sign of β_4 in equation (2). It indicates that the enterprise's size has become less important in explaining the credit spread and, thus, weakening the 'too big to fail' expectation. In equations (1) and (2), we examine whether firm-specific default risk influences credit spread levels. However, integrating the levels of credit spread to the level of firm risk variables is a necessary but not sufficient condition for credit spread to serve as an information signal on changing bank risk. We need changes in bank risk to be reflected in credit spread changes (Krishnan et al., n.d.). To assess the impact of the default wave of SOEs in 2020 on the risk-sensitivity of the firm-specific default risk, we follow Hadad et al. (2011) and Balasubramnian and Cyree (2014) to test the following model:

$$\Delta Ys_{itk} = \beta_1 \Delta Risk_{it-1} + \beta_2 Post_1 * \Delta Risk_{it-1} + Controls + \varepsilon_{it} + \omega_i + \sigma_{it} \quad (3)$$

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where: $\Delta YS_{(ijt)}$ is the change in yield spread for bond i issued by enterprise j between quarter t -1 and quarter t, and $\Delta Risk$ is the change in the risk measurement for bond i between time t-1 and time t. Following Hadad et al. (2011), we use the dynamic panel data technique in the specifications of equations (1), (2) and (3) because market discipline varies over time, and the dynamic panel provides more accurate results than a static panel that uses the fixed and/or random effects models. We use the two-step Generalized Method of Moments (GMM) estimator, specifically, the System GMM of Arellano and Bover (1995) and Blundell and Bond (1998), which is an extension of the standard GMM of Arellano and Bond (1991), is used to obtain an estimator with improved precision to control for endogeneity and other unobserved heterogeneity in a dynamic panel setting. The panel estimator controls for potential endogeneity by using instruments based on lagged values of the explanatory variables (Cubillas et al., 2012).

3.2. Market Influence

Market discipline is defined as a two-side market mechanism. On the one hand, financial investors react to risk signals and other market information (e.g., events leading to reputation damage can have an impact on debt pricing) that can impact debt value. On the other hand, bond issuers react to market devaluation signals and new policies by adjusting their risk-taking strategies (Rommerskirchen, 2015). Following the studies by Distinguin et al. (2012), Baele et al. (2014) and Kok et al. (2023), we first explore the presence of corporate bond influencing effect by whether the managers of SOEs respond to market risk signals. The market influence effect describes the situation when the manager adjusts the risk-taking level in response to market risk signals; market discipline leads to firms' ex-post reversing excessively risky actions (Flannery & Bliss, 2019). Specifically, the market influencing effect describes credit events that prompt enterprises to adopt stricter future risk management practices (Gao et al., 2020). Our study aims to explore the bond market discipline of SOEs owned by local government; bond defaulted in the same province may lead to the market's suspicion about the provincial government's willingness and capacity to provide a bailout for corporate bonds issued by other enterprises located in the same province (T. Huang, 2021). We thus use the dummy variable default, which equals one if there is at least one bond issued by SOEs that defaulted in the previous year as the risk signal to other SOEs in the same regions, otherwise zero. Following the conceptual definition of Gao et al. (2020), bonds defaulted in the same province should induce other SOEs to take fewer future risks. The empirical model is written as:

$$Risk\ taking_{jt} = \delta_1 Risk\ taking_{jt-1} + \gamma_{jt} Risk\ signal_{jt-1} + \text{Controls} + \epsilon_{jt} \quad (4)$$

To detect whether the default wave of SOEs in 2020 enhanced the influencing effect as an improved market discipline, we add the interaction item between the dummy Wave, which equals one for bonds issued after 2020, and the empirical equation can be written as:

$$\begin{aligned} \text{Risk taking}_{jt} = {} & \delta_1 \text{Risk taking}_{jt-1} + \gamma_1 * \text{Risk signal}_{ijt-1} \\ & + \gamma_2 * \text{post} * \text{Risk signal}_{jt-1+} \text{controls} + \epsilon_{jt} \end{aligned} \quad (5)$$

The explained variable Risk taking_{jt} in equations (4) and (5) refers to the strategic risk-taking of enterprises j in year t. In this study, we use the factor analysis results of R&D expenditure, capital expenditure, and long-term debt to measure the strategic risk-taking of enterprises. Since these three indicators overlap one another, adding the factors may overestimate the real level of enterprises' strategic risk-taking; factor analysis can solve this issue (Martin et al., 2013). R&D expenditure refers to the enterprise's total annual R&D expenditure. Capital expenditure refers to the net cash paid for purchasing and disposing of fixed, intangible, and other long-term assets. Long-term debt is the sum of various types of debt held for more than 1 year. The combination of the three factors is used as a proxy variable to measure the level of strategic risk taking, reflecting the proactive strategic choice of enterprises in response to external uncertainties and market opportunity identification, which corresponds to the institutional background of this study.

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3.3. Data

We use bond trading and issuer's financial data from 2017 to 2023 from the Wind database. We exclude data in 2020 because the global pandemic and default wave of SOEs created systematic panic in the bond market. There is a remarkable difference between SOEs controlled by central government (CSOEs) and state-owned enterprises controlled by local governments (LSOEs). The former have dominant powers that are crucial to national security and welfare. These entities comprise some of the biggest companies in China and the world, such as major banks, steelmakers, power companies and telecommunications operators. As a result, C-SOEs have solid political ground, enjoy the strongest, stable government support and are less likely to be influenced by market environment changes (Chang & Li, 2024). We thus use only bonds issued by listed L-SOEs.

4. Results

4.1. The Monitoring Effect

Table 1 presents the descriptive statistics for the variables in equation (1). We exclude outliers, leaving a sample of 4571 observations. The standard deviation of the variables is relatively small, except for GDP growth, which indicates that the macro-economy fluctuated during the COVID-19 pandemic crisis. However, SOEs were not severely affected, which indirectly indicates the government's implicit guarantee to the state sector.

Table 1. Descriptive statistics of variables in equations (1), (2), and (3).

Variable	Obs	Mean	Std. Dev.	Min	Max
Y	4571	1.508	1.164	-2.623	5.873
Risk	4571	-0.214	0.827	-10.462	1.532
Size	4571	25.862	1.42	21.167	28.636
Credit	4571	7.656	0.792	1	8
Time	4571	3.348	0.772	0	5.398
Roa	4571	0.015	0.023	-0.173	0.203
MB ratio	4571	1.013	0.344	0.634	8.457
Issue size	4571	2.366	0.725	-4.605	4.382
Current	4571	1.182	0.678	0.13	12.245
Leverage	4571	0.673	0.127	0.12	1.146
Asset	4571	0.928	0.104	0.164	1
S-Growth	4571	0.174	0.928	-1.848	22.942
GDP Growth	4571	6.203	3.601	2.5	18.3
M2zs	4571	0.025	0.015	0.008	0.056

4.1.1. Baseline Regression Result

Table 2 reports the empirical estimation results of equations (1) and (2). The credit risk proxy is significantly negative at the 5% level (Table 3, Column 1). This means that higher credit risk is linked to a higher credit spread since the KMV's distance to default is a reverse proxy of credit risk. The bond market can effectively keep an eye on issuers before 2020, as shown by the significant positive risk-yield relationship (Saheruddin & Soedarmono, 2022). The sign of the control variables generally aligns with the findings of Ge et al. (2020), e.g., enterprise size exhibits a significant negative sign at the 10% level, indicating that bond issuers may have an expectation of being too large to fail.

Table 2. Estimation results of equations (1) and (2).

	Equation (1)	Equation (2)
L.Y	0.232***	0.368***
	(4.370)	(4.965)

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L.risk	-0.246**	-0.041
	(-2.260)	(-0.691)
L.size	-0.174*	-0.026
	(-1.754)	(-0.333)
risk*post		-0.282***
		(-2.749)
size*post		-0.014***
		(-4.311)
credit	-0.674***	-0.473***
	(-3.396)	(-3.037)
time to maturity	0.236***	0.187**
	(3.056)	(2.568)
roa	5.901***	4.317***
	(3.576)	(3.248)
Market to book	-0.081	-0.100
	(-0.401)	(-0.539)
issue size	0.569***	0.335**
	(2.853)	(1.983)
current	-0.200	-0.036
	(-1.259)	(-0.424)
lev	1.513*	0.577
	(1.755)	(0.890)
asset	1.562	2.330
	(0.716)	(1.502)
sales growth	0.172***	0.046
	(2.911)	(1.047)
GDP growth	-0.016*	-0.010
	(-1.750)	(-0.887)
m2zs	5.622***	3.906***
	(4.072)	(3.364)
cons	6.321**	1.604
	(2.243)	(0.811)
Number of observation	2316.000	2316.000
AR(2) test (p-value)	0.065	0.116
Hansen test (P-value)	0.057	0.896

Note: *, * * and * ** represent significance at 10%, 5% and 1% level. Standard errors are reported in parentheses.

Table 3. Robustness test results of equations (1) and (2).

	(1)	**(2)**
L.Y	0.247***	0.160**
	(3.622)	(2.278)
L.zscore	-0.263**	-0.182
	(-1.982)	(-0.930)
L.size	-0.178**	-0.016
	(-2.087)	(-0.170)
Zscore*post		0.207
		(0.884)
Size*post		-0.030**
		(-2.470)
credit	-0.717***	-0.573***
	(-5.514)	(-4.767)
time	0.282***	0.151*

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	(3.470)	(1.835)
roa	6.196***	2.732*
	(4.117)	(1.841)
Market_to_book	-0.044	0.136
	(-0.223)	(0.527)
issue_size	0.463***	0.337**
	(3.187)	(2.108)
current	-0.228	-0.001
	(-1.599)	(-0.016)
lev	1.662**	1.763**
	(2.121)	(2.313)
asset	3.680*	1.298
	(1.810)	(0.608)
growth	0.074	0.070
	(1.461)	(1.311)
GDP_growth	-0.024**	-0.003
	(-2.032)	(-0.256)
m2zs	1.792	3.119*
	(1.194)	(1.860)
cons	5.300*	2.754
	(1.900)	(1.029)
N	2221.000	2221.000
AR(2) p-value	0.095	0.042
Hansen test p-value	0.990	0.194

Note: *, * * and * ** represent significance at 10%, 5% and 1% level. Standard errors are reported in parentheses.

In the Chinese context, our findings are consistent with those of R. Zhang et al. (2022), who find that market discipline exists in the Chinese corporate bond market towards SOEs after the first bond default in 2015 because investors can rationally price corporate bonds according to their risk profile. Around 90 percent of corporate bonds are traded in the inter-bank debt market in China, and commercial banks are the main bond holders (Amstad & He, 2019). Since 2002, Chinese regulators have implemented a series of market-oriented reforms in the banking sector that have effectively improved bank competition and efficiency (Ye et al., 2019). Currently, banks in China, primarily driven by the profit-maximization goal, have a greater incentive to monitor the risk-taking of corporate bond issuers. The importance of the credit spread for default risk reflects this.

At the 5% level, the results in equation (2) show that the interaction term (risk x post) has a significant, negative impact on yield spread. This indicates investors attach higher significance to default risk (Saheruddin & Soedarmono, 2022). There are two possible reasons for the enhanced market monitoring effect. First, the deteriorating balance sheet of financial institutions urges them to be more cautious in dealing with their portfolios. The defaults of several large SOEs have triggered the market and social media's massive concern about banks' financial stability that held a large amount of SOE bonds. In April, Fitch Ratings (2024) issued a negative outlook for the 'big five' banks in China because of similar concerns. Banks, therefore, had an increased incentive to actively monitor bond issuers to alleviate external concerns. Second, the decreasing capacity of local governments to support SOEs led banks to re-estimate the SOEs' bailout probability. Many local governments in China have faced severe fiscal distress after the global pandemic and can no longer provide full bailouts to SOEs as they did in the past (T. Huang, 2021).

However, we document a significant negative sign of post*size at the 5% level. This indicates that the'too big to fail' expectation has been further strengthened after the default wave in 2020. This could potentially be attributed to the adoption of the 'grab the big, let go the small' approach by Chinese regulators during the market reforms of SOEs, which was initiated in the late 1990s under the leadership of former Premier Zhu Rongji. During this period, small SOEs were largely privatized

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or even closed, and many new SOEs were established. Newly established SOEs were typically larger, had higher productivity, and operated in a more market-oriented format (Hsieh & Song, 2016). Large SOEs are more able to provide employment and are more important to local economies; governments may thus selectively focus on providing support to large SOEs and let some small SOEs be privatized or even shut down (Chang & Li, 2024). Such a practice increases the market's expectation of the "too big to fail" philosophy; large SOEs of great importance to the local economy are not likely to fail. This expectation is reflected in the negative sign of the interaction term (post *size).

In conclusion, our results show investors attach higher significance to the credit risk of bonds issued by SOEs. However, the 'too big to fail' expectation persists. To improve the study's robustness, we use an alternative proxy, Altman's Z-score, for default risk in equation (1) to replace Morton's distance to default (see Table 4). The empirical results are consistent with the findings from equation (1).

4.1.2. Risk-Yield Sensitivity Results

The results of equations (1) and (2) confirm the prerequisite for improving market discipline in the Chinese corporate bond market; i.e., the default risk becomes more important to explain the yield spread. If credit spreads are to act as an effective monitoring device, then changes in firm risk variables should immediately be reflected in the changes in the credit spread curve (Balasubramnian & Cyree, 2014). Table 4 presents the estimates from equation (3). Column 1 shows that the incremental distance to default (decreasing default risk) is significantly associated with a decreasing credit spread at the 1% level, which indicates that investors in the corporate bond market act in a timely manner for firms' risk-taking behavior. Column 2 shows that the active monitoring effect is enhanced after 2020 as the interaction term post*change of default risk is significantly negative at the 5% level. Equations (1), (2), and (3) lead to the conclusion that the market monitoring effect will improve in the Chinese corporate bond market after 2020 (Balasubramnian & Cyree, 2014). Our results are similar to W. Huang and Chang (2021), who noticed the 'flying to safety' effect in the bond market. Bond investors reacted in a timely manner to SOEs' defaults in 2015 by re-allocating their portfolio and replacing SOE bonds with Treasury bonds. In 2020, several unexpected defaults on bonds issued by large SOEs shocked the Chinese financial market. Particularly, the failure of the AAA-rated L-SOE, Yongcheng Coal, led to a sell-off of several weak local SOE bonds. Our findings corroborate the BNP Paribas reports on Chinese credit bonds, indicating that investors will reorganize their credit selection procedures and adopt a more cautious approach towards local SOE bonds (Lo, 2020), as evidenced by the rising credit spread to default risk. Thus, we conclude that the Chinese regulator has partially achieved its goal of undermining investors' faith in implicit guarantees that troubled SOEs will receive bailouts (Mercator Institute for China Studies [MERICS], 2020).

Table 4. Estimation results of equation (3).

	(1)	**(2)**
L.Y	-0.461***	-0.435***
	(-9.497)	(-11.167)
Lisk	-0.466***	0.037
	(-2.655)	
Size	-0.023	-0.072
	(-0.097)	(-0.372)
change of risk* post		**-0.374****
		(-2.135)
change of size*post		-0.000
		(-0.034)
credit	-1.431***	-1.091*
	(-3.373)	(-1.666)
Time	0.138	0.135
	(1.431)	(1.357)

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Roa	-0.408	3.718
	(-0.106)	(1.358)
Market to book	0.090	-0.057
	(0.443)	(-0.377)
issue size	0.323	-0.152
	(0.941)	(-1.018)
current	0.023	-0.028
	(0.101)	(-0.250)
Lev	-2.463	-0.533
	(-1.179)	(-0.327)
Asset	-11.180	-8.946
	(-1.494)	(-1.541)
growth	-0.124	-0.093
	(-1.358)	(-1.400)
GDP growth	-0.028***	-0.030***
	(-2.914)	(-2.623)
m2zs	-1.067	-1.494
	(-0.387)	(-0.656)
N	1237.000	1237.000
AR(2) P value	0.148	0.095
Hansen test p value	0.091	0.273

Note: *, * * and * ** represent significance at 10%, 5% and 1% level. Standard errors are reported in parentheses.

4.1.2. Regional and Industrial Heterogeneity Analysis

R. Zhang et al. (2022) find that the Chinese central government's industrial policy and the local government's fiscal condition impact the strength of bailouts for SOEs. Enterprises that belong to strategically important industries are more likely to receive government support. Provinces with greater fiscal abundance have more capacity to provide support to SOEs located in their territory. In this study, we first introduce a dummy variable. For enterprises that belong to systematically important industries (infrastructure, electricity, communication, and natural resources), industry equals one. According to R. Zhang et al. (2022), enterprises located in developed regions such as Shanghai, Beijing, Jiangsu, Zhejiang, Guangdong, and Shandong provinces are assigned a value of one for the dummy variable Region. We introduce the two dummy variables into equation (1) to obtain two new interaction terms: risk*post*industry and risk*post*province. We are interested in exploring whether different industrial policies and regional economic development levels have an impact on the strength of bailout expectations and the evolution of bond market discipline. Tables 5 and 6 show the results of the heterogeneity analysis. The interaction term risk*post*industry is significantly positive at the 1% level. The result is consistent with (R. Zhang et al., 2022) that the central government's industrial policies have important roles in capital allocation and that banks give preference to strategically important enterprises because they are more likely to receive subsidies from governments. The interaction term risk*post*industry has a positive sign, indicating that it enforces the bailout expectation and weakens the impact of the default wave on the enhancement of market discipline. Surprisingly, the term risk*province is significantly negative at the 10% level, which suggests that the bond market discipline is more pronounced in developed regions. In addition, the interaction term risk*post*province is significantly negative at the 5% level, indicating that the monitoring effect's improvement is more pronounced in economically developed regions. One explanation is that economically developed regions have a higher level of marketization with less frequent government intervention in the capital market (Wang et al., 2021). The private sector is well-developed in these regions and can absorb abundant labor and support regional GDP growth, making it less efficient for governments to provide support to SOEs to maintain the employment rate.

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Table 5. Industrial heterogeneity results.

	(1)	(2)
Lagged.Y	0.239***	0.247***
	(4.612)	(4.531)
L.risk	-0.324**	0.022
	(-2.433)	(0.305)
risk*Industry	**0.402**	
	(1.385)	
size	-0.057	-0.120
	(-0.711)	(-1.458)
size*Industry	**0.017*** **	
	(2.686)	
risk*post*Industry		**0.492****
		(1.969)
size*post*Industry		**-0.003**
		(-0.672)
credit	-0.628***	-0.760***
	(-4.832)	(-5.993)
time	0.101	0.218***
	(1.109)	(2.767)
roa	6.202***	6.308***
	(3.961)	(4.094)
Market to book	-0.298	-0.149
	(-1.638)	(-0.646)
issue size	0.448***	0.594***
	(2.671)	(3.592)
current	-0.016	-0.161
	(-0.156)	(-1.193)
lev	0.997	1.614*
	(1.159)	(1.797)
asset	3.535	3.087
	(1.643)	(1.412)
growth	0.192***	0.141***
	(3.141)	(2.629)
GDP growth	-0.010	-0.012
	(-0.972)	(-1.233)
m2zs	6.652***	4.280***
	(4.889)	(2.975)
cons	1.994	4.146
	(0.688)	(1.438)
N	2316.000	2316.000
AR(2) P value	0.079	0.069
Hansen test p Value	0.284	0.252

Note: *, * * and * ** represent significance at 10%, 5% and 1% level. Standard errors are reported in parentheses.

Table 6. Regional heterogeneity results.

	(1)	(2)
L.Y	0.166***	0.216***
	(3.131)	(3.903)
L.risk	-0.785**	0.005

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	(-1.962)	(0.065)
risk*province	0.663	
	(1.478)	
L.size	-0.054	0.127
	(-0.548)	(1.049)
size*province	**-0.028***	
	(-1.720)	
credit	-0.754***	-0.751***
	(-5.792)	(-5.530)
time	0.222***	0.130
	(2.894)	(1.462)
risk*post*province		**-0.526*****
		(-2.645)
size*post*province		-0.024***
		(-3.470)
roa	5.051***	7.720**
	(3.429)	(2.279)
Market to book	-0.090	-0.160
	(-0.403)	(-0.683)
issue size	0.554***	0.521**
	(3.468)	(2.533)
current	-0.113	-0.095
	(-0.936)	(-0.641)
lev	1.453	0.969
	(1.612)	(1.066)
asset	2.468	-0.101
	(1.212)	(-0.038)
growth	0.137**	0.065
	(2.485)	(0.945)
GDP growth	-0.014	-0.005
	(-1.478)	(-0.492)
m2zs	4.120***	6.451***
	(2.996)	(3.173)
cons	3.687	1.754
	(1.228)	(0.498)
N	2272.000	2272.000
AR(2) test p value	0.054	0.063
Hansen test p value	0.281	0.056

Note: *, * * and * ** represent significance at 10%, 5% and 1% level. Standard errors are reported in parentheses.

4.2. The Influencing Effect

Factor analysis reveal two factors capture 82.45% of the variance. This suggests that R&D expenditure, capital expenditure, and long-term debt can be aggregated into two indicators. Table 7 shows the descriptive statistics for equation (5).

Table 7. The descriptive statistics of equation (5).

Variable	Obs	Mean	Std.Dev	Min	Max
risk taking	1147	0.001	0.837	-10.437	5.453
risk signal	1147	0.004	0.066	0	1
Age	1147	22.833	5.566	7	43
ROA	1147	0.03	0.039	-0.191	0.247
Lev	1147	61.201	15.078	11.752	99.668

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turnover	1147	97.037	1823.824	0.033	59057.75
Gzc	1147	0.238	0.221	0.001	0.852
Wzc	1147	0.294	0.179	0.026	0.885
TQ	1147	1.174	0.76	0.634	12.149

Table 8 shows the results from equation (4). The coefficient of risk signal is positively correlated with the strategical risk-taking level of SOEs at the 5% level, which indicates that the default of SOEs induced other SOEs in the same region to take more risks. We also noticed that a firm's age is associated with higher risk-taking, while asset turnover is significantly negative at the 5% level, which is consistent with the idea that as risk signal from defaults increase, older SOEs mainly because of their established networks and resources are more likely to adopt riskier strategies. The results reject hypothesis 3 and show a lack of market-influencing effect before 2020. A possible explanation for this might be that, before 2020, LSOE defaults were relatively less frequent than POE defaults (T. Huang, 2021). Managers of LSOEs did not regard the no-bailout policy as a credible commitment. SOEs must bear several social and political burdens because their managers may not be fully capable or willing to adjust their risk-taking according to the market environment. As a result, the risk signals in the corporate bond market fail to influence the strategic risk-taking strategy of SOEs. Another explanation is that local governments gave up supporting some small SOEs and have more fiscal capacity to support larger SOEs, which has been common practice in the market reform of SOEs in China since the 1990s (Hsieh & Song, 2016). This explains why bond defaults in the same province are linked to higher risk-taking by other SOEs. Table 9 shows the results of equation (5). The interaction term of the post-risk signal is significantly negative at the 5% level and related to the risk-taking of enterprises, which indicates that, after 2020, SOE defaults will lead other SOEs located in the same province to take fewer risks. The results from equation (4) reveal that the market-influencing effect is detected only after 2020. After the global pandemic, local governments in China faced more severe fiscal stress, and the central Chinese government made several clear signals to cut down bailouts and induce market discipline for SOEs (T. Huang, 2021; MERICS, 2020). The change in the institutional and regulatory environment has shaped the SOEs' expectation of being rescued during financial distress, and they have responded by strategically taking fewer risks. The results suggest that a too-slow reform strategy may fail to limit SOE risk-taking because managers will not regard such reform as a credible commitment.

Table 8. Empirical results of equation (4).

L.risk taking	-0.447***
	(-12.080)
L.risk signal	*0.766***
	(5.834)
Age	0.065***
	(3.411)
ROA	1.546
	(0.978)
lev	-0.015
	(-0.523)
turnover	-0.001*
	(-1.912)
gzc	-1.520
	(-0.672)
wzc	-0.836
	(-0.644)
TQ	-0.091
	(-0.394)
N	748.000

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AR(2) p-value	0.195
Hansen test p-value	0.891

Note：* , * * and * ** represent significance at 10%, 5% and 1% level. Standard errors are reported in parentheses.

Table 9. Empirical results of equation (4).

	Risk-taking
L.risk taking	-0.451*** (-12.857)
L.risk signal	1.219*** (5.666)
Post*risk signal	-0.837*** (-4.653)
Age	0.067*** (3.571)
ROA	1.281 (0.851)
lev	-0.012 (0.410)
turnover	-0.001 (-2.040)
gzc	-0.973 (-0.440)
wzc	-0.749 (-0.593)
TQ	-0.098 (-0.424)
N	748
AR(2)	0.198
hansen test p value	0.790

Note：* , * * and * ** represent significance at 10%, 5% and 1% level. Standard errors are reported in parentheses.

5. Conclusion

Effective bond market discipline can alleviate the distortion in the Chinese capital market and improve the efficiency of SOEs (Ning et al., 2019). Recently, the Chinese central government has launched several reforms to enforce bond market discipline. Whether such a gradualism strategy has achieved its goal is not well explored. Taking the default wave in 2020 as a watershed for the marketization of SOEs in the Chinese corporate bond market, this study examines the impacts of the surge in SOE default cases on the two-side market discipline of corporate bonds issued by L-SOEs in China. After controlling a series of enterprise-specific and macroeconomic variables and taking potential endogeneity into consideration, we conclude there is a partial improvement in market discipline following the acceleration of the no-bailout reform in 2020.

Our results reveal that effective market monitoring occurred even before 2020, and investors became more sensitive to the default risk of bond issuers after 2020. The effect is greater for enterprises located in economically developed provinces but less so for enterprises in systematically important industries. However, we observe that the 'too big to fail' expectation still exists in the Chinese corporate bond market, with investors showing greater tolerance for the risk-taking of large enterprises. Surprisingly, this situation deteriorated after 2020. For the market-influencing effect, we observe that before 2020, the market lacked the capacity to discipline the strategic risk-taking of SOEs.

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However, the default wave changed this situation and intensified the market-influencing effect. Our results support the notion that faster reform is better at enhancing market discipline.

Our results have several policy implications. First, the increase in no-bailout cases of SOEs after 2020 improves market discipline in the capital market. On the one hand, investors become more sensitive to the default risk of bond issuers; on the other hand, it disciplines the risk-taking of bond issuers. The Chinese corporate bond market has become more market-oriented and healthier in this restructuring, as indicated by international financial institutions and rating agencies (Chang & Li, 2024; Lo, 2020). By comparing the capital market before and after 2020, we document that faster reform can further enhance market discipline. As effective market discipline is essential to improve resource allocation in the capital market (Y. Huang & Wang, 2017), and to alleviate the deteriorating fiscal conditions of several regional governments (Ning et al., 2019), the central government should continue to accelerate the no-bailout policy and to harden the budget constraints of SOEs to enforce credit market discipline. Secondly, we notice that the 'too big to fail' expectation persists in the Chinese corporate bond market even after 2020. Because of the COVID-19 pandemic shock and years of excess leverage, several large SOEs are dragging down the regional economy in China, but local governments may still attempt to avoid exposing risks in their ill-managed state sector through bond defaults, which may, in turn, put greater pressure on their finances (T. Huang, 2021). As indicated by Tsafack et al. (2021), Chinese regulators need to be cautious about the accumulation of leverage in large SOEs and the affiliated contingent liability issues of local governments with deteriorating fiscal conditions. Several local governments with poor fiscal conditions, e.g., Guizhou and Qinghai provinces, are not able to reconstruct money losing SOEs on their own and are trapped in a dilemma. The default of SOEs could severely undermine regional economic growth and lead to capital outflow (MERICS, 2020), whereas continuing to support these SOEs may exacerbate the soft budget problem and create more contingent future government liability. The Chinese central bank and Treasury Ministry need to step in and apply a more market-oriented method to support the reconstruction in those provinces. Finally, we also notice a lack of market capacity to influence the risk-taking of SOEs before 2020, which suggests that a too-slow reform strategy for hardening the budget constraint of SOEs is not credible enough to discipline the risk-taking of SOEs, which may, conversely, exacerbate the excessive leveraging issue in SOEs. Managers of SOEs are mostly selected by bureaucrats in China, and they do not bear the direct consequences of bankruptcy (W. Zhang, 2006). Such agency conflicts and operational problems weaken the market's ability to discipline SOEs' risk-taking. The Chinese regulator needs to design the incentive mechanisms better and hold SOE managers accountable for their risk-taking decisions.

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