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Bond covenants and the speed of corporate capital structure adjustment: Evidence from China

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Abstract

We investigate the effect of bond covenants on the speed of corporate capital structure adjustment. Based on manually collected bond covenant information from publicly listed Chinese firms between 2007 and 2019, we construct an index that measures the intensity of corporate bond covenants. Our results show that the greater the covenant intensity index of a firm's debt covenants, the faster the capital structure adjustment. Option covenants, restrictive asset transfer covenants, restrictive investment covenants, and event-driven covenants all have a positive and significant association with the speed of capital structure adjustment, whereas no such effect is observed for financing covenants and repayment arrangement covenants. Furthermore, we examine the direction of adjustment and adjustment method, and demonstrate that bond covenants promote an upward adjustment in a firm's capital structure by increasing debt financing. An analysis of heterogeneity effects reveals that the positive relation between the intensity of bond covenants and speed of capital structure adjustment is more pronounced in state-owned companies and companies headquartered in areas with higher legal standards. Finally, we show that information transparency, internal

control, and environmental, social, and governance (ESG) performance are channels through which bond covenants affect the speed of capital structure adjustment.

JEL CLASSIFICATION
D86, G32

1 | INTRODUCTION

Maximizing firm value often requires firms to adjust their capital structure toward an optimal target level. This adjustment process, however, involves a series of challenges, including the firm's ability to secure additional capital and the associated costs of making these changes (Chen & Li, 2019; Flannery & Rangan, 2006; Hovakimian et al., 2004; R. Huang & Ritter, 2009; Sheng et al., 2016; Strebulaev, 2007). Enhancing a firm's capacity to access capital and reducing the cost of structural adjustments are critical in accelerating this process.

A firm's ability to adjust its capital structure efficiently is crucial to maximizing shareholder wealth and minimizing financial risk. Previous studies have explored various factors affecting capital structure adjustment, including macroeconomic and institutional influences (Cook & Tang, 2010; Liu et al., 2020; Ma & Zhu, 2020; Öztekin & Flannery, 2012; Wang et al., 2018), credit line and equity capital considerations (Lockhart, 2014; Zhou et al., 2016), and corporate governance dynamics (An et al., 2015; Chang et al., 2014; Zheng & Li, 2018). However, research examining the role of bond covenants in capital structure adjustments, particularly from the perspective of public debt financing in emerging markets, remains sparse. This study aims to address this gap by examining how bond covenants influence capital structure decisions in China, one of the world's fastest growing emerging economies and the second largest bond market globally.

The urgency of capital structure adjustments is particularly evident in the Chinese market, where economic conditions have shifted dramatically since December 2017, when the central government called for deleveraging. In the face of challenges such as the US–China trade war, COVID-19 pandemic, and geopolitical shifts from the Russian invasion of the Ukraine, China's economic slowdown, rising corporate debt, and increasing default risks have intensified the need for flexibility in capital structure adjustments. Despite rapid growth in China's corporate bond market—from 1.18 trillion yuan in 2007 to 38.70 trillion yuan in 2020—the market has been marred by increasing bond defaults. Notably, the default of two AAA-rated state-owned enterprise (SOE) bonds in November 2020 shattered the longstanding assumption of government-backed bond safety, causing widespread market panic and increased volatility in bond prices.[1] In that month, two AAA-rated bonds issued by SOEs, the Brilliance Group and the Henan Yongcheng Coal Power Holding Group, defaulted. This not only led to a collapse in "SOE faith"—the assumption by investors that SOEs would never default—but also resulted in a market panic, causing a plunge in SOE bond market prices as well as a sharp increase in the overall volatility of the corporate bond market.

From an academic perspective, studying the Chinese corporate debt market provides meaningful insights because it exhibits structural features that are distinct from the US and other developed economies. First, China's bond market evolved directly from the banking sector (Amstad & He, 2019), with commercial banks serving as both major underwriters and primary investors. This structure creates an unusual dynamic, one seldom seen in developed markets: Corporate bonds held by banks directly compete with the banks' own loan products. Because these bondholders are largely state-owned banks under strict regulatory oversight, they tend to demand covenants to safeguard against credit risk. Second, China's relatively weak institutional environment

[1]Based on data from the Wind database (https://www.wind.com.cn/).

leads to significantly shorter bond maturities than those in advanced economies. This provides a compelling setting for exploring the role of covenants in capital structure adjustment. Third, Ding et al. (2022) report that Chinese corporate bonds are often overpriced, in contrast to the underpricing typically observed in the United States and elsewhere. Consistent with this pattern, Shi et al. (2018) find that the inclusion of covenants helps mitigate such overpricing by enhancing information disclosure. Taken together, these factors underscore the need for a comprehensive examination of debt covenants to better understand the unique characteristics of China's corporate bond market.

In this context, bond covenants, which define the rights and obligations of debt issuers and creditors, play a significant role in managing default risk. The terms of these covenants can have competing effects on capital structure adjustment speed: (1) they may reduce agency costs, signaling stronger governance and improving financing ability, thereby facilitating quicker adjustments, or conversely, (2) stricter covenants may limit a firm's flexibility by reducing perceived bankruptcy risk, potentially diminishing the incentives for structural changes. Whereas previous research (e.g., Devos et al., 2017) has highlighted the negative impact of loan covenants on capital structure adjustments, our study shifts the focus to bond covenants, which have distinct features in the Chinese context compared to developed markets like the United States.

Unlike Devos et al. (2017), who examine financial covenants in US bank loans, we investigate restrictive covenants in Chinese corporate bonds. This distinction is important for three reasons. First, China's commercial banks are predominantly state controlled and subject to strong administrative intervention. Given their monopoly position and the implicit government guarantees attached to bank loans, loan covenants in China are often symbolic, with limited disclosure of contractual details. In contrast, the corporate bond market is more market oriented. Covenant design in bonds reflects both the extent of issuer disclosure and the actual constraints imposed on corporate behavior. Second, whereas Devos et al. (2017) focus on financial covenants—typically tied to accounting ratios—we concentrate on restrictive covenants. These clauses limit firms' financial and investment activities, such as dividend payouts, security issuance, capital expenditures, and mergers and acquisitions (M&As). Restrictive covenants tend to induce greater disclosure and enable more effective monitoring by debtholders (Chava et al., 2019). Third, China's weaker legal and institutional framework, compared with the United States, renders its debt markets more opaque. As a result, covenants convey greater informational value for investors in China than in developed markets. As Schweizer et al. (2023) argue, the institutional characteristics of emerging bond markets warrant separate analysis. China's bond market is particularly noteworthy not only because of its size and global significance but also because of its unique political and legal environment. The market is nascent yet rapidly expanding, and it operates amid high information asymmetry and weak creditor protection (Guo et al., 2021; Livingston et al., 2018). Given these institutional differences, we examine whether bond covenants in China facilitate capital structure adjustment through credible signaling, or whether they constrain firms' financing flexibility and slow down adjustment. Furthermore, we expand the literature by analyzing both financial and restrictive covenants, whereas Devos et al. (2017) consider only the former.[2]

Our research employs manually collected information on the bond covenants of Chinese listed companies from 2007 to 2019. We use those data to construct a covenant intensity index, which in turn allows for an in-depth exploration of the impact of bond covenants on a company's capital structure adjustment speed. Our empirical results suggest that the intensity of bond covenants is positively associated with the dynamic adjustment speed of a firm's capital structure and provides support for the theoretical notion that bond covenants have a positive effect on firm value. We find that option covenants, restrictive asset transfer covenants, restrictive investment covenants, and event-driven covenants all have a positive impact on the speed of corporate capital structure adjustment, whereas restrictive financing covenants and repayment arrangement covenants exhibit no significant influence.

[2]Financial covenants are typically based on the borrower's accounting information and require the firm to meet certain accounting ratios. In contrast, restrictive contracts pose limitations on the borrower's financial and investment activities including dividend payouts, stock and debt issues, capital expenditures, and mergers (Chava et al., 2019).

Moreover, the positive effect is more pronounced for SOEs and firms in regions with stronger legal protections. Finally, our analysis of the transmission channels through which bond covenants facilitate capital structure adjustment reveals that stronger corporate information transparency, more effective internal controls, and higher ESG performance each amplify the positive impact of bond covenants on the speed of adjustment.

2 | LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 | Role of bond covenants

Conflicts between shareholders and creditors are often linked to adverse selection and moral hazard problems. In this subsection, we review the literature on the potential role of bond covenants in alleviating these issues.

Strictly designed covenants can send positive corporate governance signals to the market, reduce adverse selection problems, and lower corporate financing costs (Demiroglu & James, 2010). Moreover, the greater the degree of protection of the bond, the more conducive it is to the growth and development of the firm (Shi et al., 2017). Specifically, asset transfer covenants can reduce the actual issue rate by 61 to 73 basis points (bps), investment restrictions by 60 to 78 bps, and option covenants by 111 to 127 bps (Shi et al., 2018).

Moral hazard between creditors and shareholders is mainly reflected in the possibility that shareholders may act in ways that are beneficial to themselves but detrimental to creditors. Corporate shareholders may, for example, engage in risky investments to increase their own returns at the expense of creditors (Chava et al., 2019; Jensen & Meckling, 1976). The literature confirms that debt covenants can effectively mitigate the agency conflict between creditors and shareholders. Chava et al. (2009) analyze the impact of management barriers using corporate bond data from 1993 to 2007. They find that bond covenants can reduce firm risk by limiting management's aggressive investment behavior and avoiding excessive investment risk. Reisel (2014) finds that bond covenants can significantly reduce the moral hazard and borrowing costs within firms, and that covenant restrictions on venture capital can reduce the cost of debt financing by 35 to 75 bps. Bradley and Roberts (2015) use a large dataset of private loan information to analyze 12,425 private corporate loan agreements between 1993 and 2001. They conclude that there is a potential conflict of interest between shareholders and bondholders, and that covenants can reduce debt agency costs, enhance firm value, and promote firm growth. Zhen et al. (2019) use bond covenant information from 2007 to 2016 and find that the higher the number of bond covenant provisions, the better the accounting quality of the issuer, especially among low-rated issuers. Docgne (2022) finds that debt covenants can effectively mitigate agency problems related to inefficient corporate investments.

In addition, several studies analyze covenants in terms of their impact on firm value. These studies have produced conflicting findings. Nash et al. (2003) and Devos et al. (2017) show that bond covenants lead to lower firm value. They argue that this is a consequence of bond covenants reducing the flexibility of a firm's management, which is detrimental to its investment and financing. Conversely, Chava et al. (2009) and Reisel (2014) find that bond covenant terms can reduce firm financing costs, thus benefiting contracting parties and increasing firm value.

2.2 | Factors predicting the speed of corporate capital structure adjustment

A rich set of theories has driven scholars to conduct in-depth analyses of capital structure and its dynamic adjustment. Prior studies have recognized that different firms have different strategies for reaching their target capital structure and varying speeds of adjustment toward it (Byoun, 2008; Faulkender et al., 2012). Flannery and Rangan (2006) compare the trade-off theory, pecking order theory, and market timing theory and show that a partial adjustment model guided by the trade-off theory provides a better empirical explanation than

either of the other two theories. In addition, building on existing theories, several studies analyze the firm-specific factors and external macroeconomic conditions that affect speed of adjustment, as discussed in the following paragraphs.

With respect to internal corporate governance, R. Huang and Ritter (2009) find that the historical value of equity financing costs has a long-term impact on the dynamic adjustment of firms' capital structure by influencing corporate financing decisions. Faulkender et al. (2012) demonstrate that firms facing larger financing constraints tend to adjust their leverage more slowly and that the role of financing constraints is much more important than the role of firm size and share price in determining the speed of leverage adjustment. Lockhart (2014) argues that bank credit lines affect the speed of capital structure adjustment. He finds that when a firm's capital structure is below its target level, firms with credit lines show a higher speed of adjustment. Chang et al. (2014) examine the impact of corporate governance on the speed of adjustment and find that weaker corporate governance leads to slower adjustment. Dierker et al. (2019) and An et al. (2015) show that firms with higher financial risk tend to face higher transaction costs, and when the financial risk is severe, such firms experience slower leverage adjustments.

Regarding macroeconomic factors, it has been shown that firms adjust more quickly to their target structure in a healthy economy (Cook & Tang, 2010; Gan et al., 2021). In addition, Çolak et al. (2018), Wang et al. (2018), and Im et al. (2020) illustrate that uncertainty in the financial environment increases financial frictions and raises the cost of financial intermediation, thereby hindering the speed of capital structure adjustment.

Although the literature on corporate adjustment speed is extensive, there is little research that specifically addresses the impact of bond covenants on the speed of adjustment. Only Devos et al. (2017) examine the impact of private debt covenants (banking loans) on capital structure adjustment, and only within the US market. As noted earlier, given that the differences between mature and emerging markets are significant, the role of public debt covenants on capital structure adjustment needs to be further investigated, especially in emerging markets like China where a recent bond default wave has occurred (Schweizer et al., 2023).

2.3 | Hypothesis development

The signaling effects of bond covenants and their role in regulating a company may affect the speed of corporate capital structure adjustment in various ways. Strict bond covenants reflect good protection for creditors and therefore send positive corporate governance signals to the capital market (Dang et al., 2019). As a result, comprehensive bond covenants can not only reduce the cost of adverse selection for creditors (Demiroglu & James, 2010) and boost their confidence but also enhance a firm's ability to raise additional capital from the bond market, thereby enhancing the speed of capital structure adjustment.

In comparison to the signaling effects, the regulatory and binding effects of bond covenants are less clear. It is possible to imagine that bond covenants have both positive and negative influences on the speed of capital structure adjustment. For example, because bond covenants regulate a firm's corporate governance and reduce corporate financial risk, they can restrict management's pursuit of high-risk projects (Helwege et al., 2017) and reduce the probability that shareholders will support projects that are beneficial to themselves but carry an increased risk of default (Jensen & Meckling, 1976; Smith & Warner, 1979). These covenants, which reflect the debtor's "restraint" role, can ease the conflict between creditors and shareholders (Day & Taylor, 2014). They effectively regulate the behavior of company insiders (Chava et al., 2019), thereby reducing the company's investment and financing risks and the expected risks of creditors. According to this argument, bond covenants help companies reduce the cost of bankruptcy and increase the speed of capital structure adjustment (Flannery & Rangan, 2006). However, bond covenants may also reduce the flexibility of a company's management through strict contractual constraints. For example, they can restrict a firm's investment and financing behavior, which in turn affects the firm's subsequent financing and recapitalization (Devos et al., 2017). Furthermore, firms that violate

bond covenants are required to transfer control to creditors, which may adversely affect a firm's investment and financing decisions. Strict bond covenants may therefore reduce the flexibility of a firm with regard to issuing new debt, which in turn impedes the speed of capital structure adjustment. Based on this discussion, we propose the following two competing hypotheses:

H1a. The greater the intensity of covenants in debt covenants, the faster the speed of capital structure adjustment.

H1b. The greater the intensity of covenants in debt covenants, the slower the speed of capital structure adjustment.

3 | RESEARCH DESIGN

3.1 | Calculation of the bond covenant index

Covenant terms, as an integral part of any bond, are essential in determining the responsibilities and rights of issuers and creditors. We draw on the classification of covenant types by Billett and Xue (2007) and Chava et al. (2019) who propose the following six categories: option covenants, event-driven covenants, repayment arrangement covenants, restrictive asset transfer covenants, restrictive investment covenants, and restrictive financing covenants.[3]

Bond covenants in textual form are difficult to quantify. We follow existing studies in identifying the years during which a covenant is associated with a loan (Devos et al., 2017) and in constructing a bond covenant intensity index (Billett & Xue, 2007).

First, we identify the period during which the covenant has an impact. The procedure is straightforward: If, for example, a bond is issued in 2015 and matures in 2018, the impact period of the covenant includes 2015, 2016, 2017, and 2018. Second, we divide the number of covenant terms stipulated in each bond covenant by the total number of frequently used covenant terms (18 terms; see footnote 3) to calculate a covenant term index for each bond. Note that the covenant term index of a given bond is fixed over its entire impact period. Finally, for a given firm in a given year, we sum the bond covenant indices to obtain the bond covenant index at the firm level. The formula is provided as follows:

$$Cov_{i,t} = \sum_{k=1}^{n} \frac{number\ of\ covenant\ terms\ in\ bond\quad k}{18}, \tag{1}$$

where k denotes the number of outstanding bonds of company i in year t, and $Cov_{i,t}$ denotes the bond covenant index of company i in year t. The higher the bond covenant index, the greater the intensity of the covenants. Because a company may issue multiple bonds in a given year, and the bond impact periods may overlap, the bond covenant index may be greater than one. The summation method allows examination of the cumulative effect of the influence of multiple bond covenants over different periods. In subsequent tests, rather than considering the total effect of all bond covenants, we perform a series of regression analyses, each of which uses a covenant index that is based on a different type of covenant.

[3]During our analysis, we identified 18 frequently used covenants: the option category mainly includes restrictions regarding adjustable interest rates, early repayments, redemptions, and resales; the event-driven category mainly refers to the technical default compensation of bonds; the repayment arrangement category mainly includes the establishment of a debt service fund, nontransferability of the main responsible person, and irrevocable guarantee; the restrictive asset transfer category mainly includes restrictions on dividends to shareholders, restrictions on related transactions, executive compensation, and external guarantees; the restrictive investment category mainly includes constraints on major foreign investments and M&As; and the restrictive financing category mainly includes restrictions on new debt issuance, asset pledges, and sale of assets.

3.2 | Calculating the speed of capital structure adjustment and design of the baseline model

Based on existing studies (Faulkender et al., 2012; J. Huang et al., 2016), we construct the following model to determine the capital structure adjustment speed of firm *i* in year *t*:

$$Lev_{i,t} - Lev_{i,t-1} = \lambda (Lev^*_{i,t} - Lev_{i,t-1}) + \mu_{i,t}, \tag{2}$$

where $Lev_{i,t}$ is the capital structure of firm *i* in year *t*, λ is the speed of adjustment of the firm's capital structure to its target level, and $\mu_{i,t}$ represents a random error term.

We determine the target capital structure of the firm, $Lev^*_{i,t}$, using the following equation:

$$Lev^*_{i,t} = \beta X_{i,t-1}, \tag{3}$$

where $X_{i,t-1}$ is a vector of firm-specific characteristics measured at the end of the previous year (*t*−1). In line with prior studies (e.g., J. Huang et al., 2016), $X_{i,t-1}$ includes the market-to-book ratio (*MTB*), profitability (*EBIT*), size (*SIZE*), collateral (*PPE*), nondebt tax shields (*DEP*), and industry median debt ratio (*MLEV*). The variables are defined in Appendix A.

To estimate a firm's target capital structure, we substitute the value of $Lev^*_{i,t}$ derived from Equation (3) into Equation (2) to obtain the following equation (see also Chen & Li, 2019; Dang et al., 2019; Faulkender et al., 2012; D. Li et al., 2019):

$$Lev_{i,t} = \lambda\beta X_{i,t-1} + (1 - \lambda)\, Lev_{i,t-1} + \mu_{i,t}. \tag{4}$$

We then employ a generalized method of moments (GMM) regression to estimate Equation (4). A fixed effects model is used later as a robustness test. We estimate the coefficient (1−λ) of $Lev_{i,t-1}$ and the coefficient $\lambda\beta$ of the control variables $X_{i,t-1}$. Next, we solve for β and substitute it into Model (3) to obtain the target capital structure $Lev^*_{i,t}$, which subsequently allows us to estimate λ in Model (2).

Model (2) is the base model for estimating the speed of capital structure adjustment. To test the impact of bond covenants on the speed of capital structure adjustment, λ is expanded to $(\gamma_0 + \gamma_1 Cov_{i,t})$ to obtain the following equation:

$$Lev_{i,t} - Lev_{i,t-1} = (\gamma_0 + \gamma_1 Cov_{i,t})(Lev^*_{i,t} - Lev_{i,t-1}) + \mu_{i,t} \tag{5}$$

That is, the speed of adjustment coefficient, λ, is separated into two components: one that is not dependent on the covenant intensity and one that is. Finally, for ease of presentation, we use $\Delta Lev_{i,t}$ to denote the actual adjustment ($Lev_{i,t} - Lev_{i,t-1}$), and *Dev* to denote the difference between the capital structure in the previous period and its target ($Lev^*_{i,t} - Lev_{i,t-1}$), resulting in the following equation:

$$\Delta Lev_{i,t} = (\gamma_0 + \gamma_1 Cov_{i,t}) Dev + \mu_{i,t}. \tag{6}$$

In this study, we estimate Equation (6) and focus on the sign and magnitude of coefficient γ_1 to explore the effect of bond covenants on the speed of capital structure adjustment.

3.3 | Sample construction

Our sample covers all publicly listed Chinese firms on the Shanghai and Shenzhen stock exchanges between 2007 and 2019. Accounting and financial data for each firm are collected from the China Stock Market & Accounting

Research (CSMAR) database. To collect the bond covenant data, we first access the corporate bond prospectus for each bond on the Wind database and then manually collect all information related to bond covenants from the prospectuses. To reduce the influence of outliers, we delete all firm-year observations that have leverage ratios greater than 1 or less than or equal to 0. In addition, we exclude: firms for which leverage data are available for less than 2 years, special treatment (ST and ST*) firms,[4] financial companies, and firms with missing data. This results in a sample of 1,771 observations. To further avoid the influence of outliers on the regression results, all control variables are winsorized at the 1% level on both sides.

3.4 | Descriptive statistics

Table 1 presents descriptive statistics for our sample. The mean value of ΔLev is 0.011 and the standard deviation is 0.066. The mean value of the bond covenant index is 0.644, the minimum value is 0, and the maximum value is 7.056. This indicates large variation in the bond covenant index among Chinese firms. Table 2 presents the classification of bond covenant clauses, where we also report the percentage of bonds that contain each covenant clause. Table 3 presents the correlation matrix for the explanatory variables.

4 | EMPIRICAL RESULTS

4.1 | Baseline results

Table 4 reports our baseline results. The coefficient on *Dev* is 0.452 without including covenants in Column 1. This implies that a firm takes an average of 2.212 (=1/0.452) years to adjust its leverage ratio to the target level. More noteworthy, when we include the interaction term between bond covenants and degree of capital structure deviation from the target level as the main explanatory variable in Column 2, the coefficient on *Cov* × *Dev* is positive (0.067) and statistically significant at the 1% level. This suggests that strict bond covenants accelerate the speed of Chinese firms' capital structure adjustments. Economically speaking, the inclusion of bond covenants increases the capital structure adjustment speed by approximately 16%. Considering the average adjustment speed of 2.4 years, this means that it takes firms with bond covenants about 4.6 months less to adjust their capital structure to the desired target level. Furthermore, when including both firm and year fixed effects in Columns 3 and 4, the coefficients of *Cov* × *Dev* remain positive and statistically significant at conventional levels, in support of H1a. Our interpretation is that a greater intensity of covenants can improve a firm's financing ability through positive signaling and superior external governance of the firm's creditors. This further reduces the cost of capital structure adjustment and accelerates its speed.

4.2 | Impact of different types of bond covenants

In this section, we examine the effects of the six major categories of bond covenant: option covenants, event-driven covenants, repayment arrangement covenants, restrictive asset transfer covenants, restrictive investment covenants, and restrictive financing covenants. Consistent with Chava et al. (2019), and considering the situation of China's bond market, we proxy for the six major categories of bond covenant using dummy variables. Specifically,

[4]China's Securities Regulatory Commission requires publicly listed firms that are experiencing financial distress to use the prefix ST or ST* in front of their stock code. The ST tag indicates that the company suffered losses for 2 or more consecutive years, and the ST* tag identifies companies that have entered formal delisting procedures.

TABLE 1 Summary statistics.

Variable	*N*	Mean	Median	*SD*	Min	Max
ΔLev	1,771	0.011	0.006	0.066	−0.276	0.812
Dev	1,771	−0.0612	−0.067	0.142	−0.566	0.499
Cov	1,771	0.644	0.500	0.518	0.000	7.056
Q	1,771	1.111	0.781	1.143	0.128	13.391
EBIT	1,771	0.055	0.050	0.043	−0.303	0.2434
SIZE	1,771	23.715	23.562	1.3834	20.615	27.075
PPE	1,771	0.22	0.162	0.198	0.001	0.748
DEP	1,771	0.018	0.014	0.016	0.000	0.078
MLEV	1,771	0.4967	0.459	0.140	0.195	0.741

Note: This table presents summary statistics for our main variables and firm-specific characteristics for our sample covering publicly listed Chinese firms from 2007 to 2019. Variables are defined in Appendix A.

TABLE 2 Bond covenant classification and proportion.

Covenant clause classification	Specific covenant	Proportion
Option covenant	Adjustable interest rates	67.93%
	Early repayments	1.41%
	Redemptions	4.12%
	Resales	66.52%
Restricted asset transfer classes	Restrictions on dividends to shareholders	88.71%
	Restrictions on related transactions	19.65%
	Restrictions on executive compensation	84.64%
	Restrictions on external guarantees	16.15%
Restricted investment	Restrictions with respect to major investments	87.58%
	Restrictions on acquisitions or mergers	87.58%
Restricted financing categories	Restrictions on new debt issuance	1.98%
	Restricted collateral assets	9.09%
	Limit pledged assets	14.57%
	Restrictions on sale of assets	15.92%
Event-driven class	Technical default compensation	64.48%
Reimbursement arrangements	Nontransferability of the main responsible person	84.81%
	Establishment of a debt service fund	6.32%
	Irrevocable guarantee	42.69%

Note: This table presents detailed information on the classification of bond covenant clauses, as well as the proportion (in percentage) of corporate bonds that have specific covenant clauses.

TABLE 3 Correlation matrix.

	1	2	3	4	5	6	7	8	9
1. *ΔLev*	1								
2. *Dev*	0.234***	1							
3. *Cov*	−0.059**	−0.114***	1						
4. *MTB*	0.058***	0.064***	−0.182***	1					
5. *EBIT*	0.031***	0.229***	−0.072***	0.281***	1				
6. *SIZE*	−0.071***	−0.161***	0.413***	−0.486***	−0.008	1			
7. *PPE*	−0.045***	−0.325***	0.035	−0.096***	−0.034***	0.024***	1		
8. *DEP*	−0.040***	−0.389***	0.074***	−0.053***	−0.037***	−0.022***	0.816***	1	
9. *MLEV*	−0.046***	−0.343***	0.109***	−0.303***	−0.096***	0.330***	−0.069***	−0.108***	1

Note: This table reports the Pearson correlation coefficients between pairwise combinations of our explanatory variables. Variables are defined in Appendix A.

**$p < 0.05$; ***$p < 0.01$.

the dummy variable of a specific type of bond covenant equals 1 if a bond features covenant terms of this type, and 0 otherwise. Table 5 provides the regression results. We can see that the coefficients of the dummy variables for options covenants, restrictive asset transfer covenants, restrictive investment covenants, and event-driven covenants[5] are positive and statistically significant. Event-driven and options covenants afford issuers greater decision-making power, thus increasing a company's flexibility in adjusting its capital structure. First, option covenants give debt issuers the option to use adjustable interest rates, early repayments, redemptions, and resales. Bond issuers can choose whether to exercise these options based on their specific financial condition. Thus, this type of covenant can enhance the financial flexibility of bond issuers and in turn increase the speed of capital structure adjustments (Hegde et al., 2023). Second, both restrictive asset transfer and restrictive investment covenants protect creditors' rights and deliver a positive signal to the capital market. Thus, they can effectively resolve the agency issue between shareholders and bondholders stemming from asset transfers and overinvestment (Bradley & Roberts, 2015; Chava et al., 2019). In addition, we find that event-driven covenants can enhance a firm's capital structure adjustment speed. The reason is that when bond issuers encounter bankruptcy risks, event-driven covenants can offer a certain level of compensation to bondholders. Overall, these four types of bond covenants serve as positive signals by protecting bondholders' interests, easing the difficulties for bond issuing firms to obtain debt financing. Hence, these covenants can substantially alleviate the costs associated with capital structure adjustments and can enhance the speed of such adjustments (Mansi et al., 2021). Third, restrictive financing covenants mainly include restrictions on new debt issuance, asset pledges, and asset sales. Even though this type of covenant can protect the interests of bondholders, it places significant restrictions on further debt financing. These restrictions can impede a firm's financing flexibility, thereby increasing a firm's capital structure adjustment costs. In addition, the personnel/repayment arrangement covenants include restrictions on the transfer of key personnel, establishment of a debt repayment fund, and irrevocable guarantees. Although the establishment of a debt repayment fund provides a certain degree of protection for bondholders, it requires bond-issuing firms to have considerable funding in place, substantially hindering their capability of obtaining further debt financing. Collectively, it is plausible that these two types of covenants can convey positive signals that are conducive to

[5]Event-driven covenants mainly refer to the compensation of bondholders in case of bond defaults. Specifically, the issuing company offers investors compensation if it is unable to make interest payments or principal repayments on time but is not bankrupt.

TABLE 4 Impact of bond covenants on the speed of corporate capital structure adjustment.

	(1)	(2)	(3)	(4)
Cov × *Dev*		0.067***	0.076***	0.041*
		(3.23)	(3.61)	(1.76)
MTB × *Dev*			−2.123	−0.995
			(−1.29)	(−0.61)
EBIT × *Dev*			0.209	0.338**
			(1.14)	(1.99)
SIZE × *Dev*			−0.005	−0.008
			(−0.13)	(−0.19)
PPE × *Dev*			−0.030	−0.091
			(−0.11)	(−0.34)
DEP × *Dev*			−6.439***	−5.489***
			(−3.32)	(−2.96)
MLEV × *Dev*			−0.059	0.152
			(−0.25)	(0.64)
Dev	0.452***	0.418***	0.768	0.712
	(8.09)	(7.86)	(0.84)	(0.75)
Constant	0.141***	0.040***	0.038***	0.138***
	(3.65)	(12.12)	(8.66)	(3.52)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes
Obs.	1,771	1,771	1,771	1,771
Adj. R^2	0.282	0.242	0.275	0.308

Note: This table reports the baseline results estimated at the firm-year level. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. The main explanatory variable is the interaction term $Cov_{i,t} \times Dev$, where $Cov_{i,t}$ denotes the bond covenant index and *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. Other independent variables are defined in Appendix A. Firm-characteristic variables are measured at the end of the previous year. We report *t*-statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

promoting corporate debt financing on one hand but can also serve as an obstacle for corporate debt financing on the other hand. These two opposite effects may offset each other, causing the overall effect of these two types of covenants to be insignificant.

Furthermore, we update our regression analysis by simultaneously incorporating various types of bond covenants. This approach enables us to evaluate which type of bond covenant significantly influences the speed of capital structure adjustment when all covenants are present. In Column 7 of Table 5, after integrating all types of covenants into the regression, the coefficients of the dummy variables for options covenants and event-driven covenants are positive and statistically significant. The coefficients of other covenants on the speed of capital structure adjustment are no longer statistically significant. This shift may be attributed to the fact that, in comparison with other types of

TABLE 5 Impact of different types of bond covenants on the speed of capital structure adjustment.

	Option (1)	Asset transfer (2)	Investment (3)	Financing (4)	Event driven (5)	Repayment arrangement (6)	All covenant types (7)
$Cov_1 \times Dev$	0.078**						0.103*
	(2.03)						(1.90)
$Cov_2 \times Dev$		0.121*					0.138
		(1.70)					(0.84)
$Cov_3 \times Dev$			0.126**				−0.041
			(2.19)				(−0.40)
$Cov_4 \times Dev$				0.066			−0.024
				(1.27)			(−0.45)
$Cov_5 \times Dev$					0.106***		0.107*
					(3.03)		(1.89)
$Cov_6 \times Dev$						0.118	0.075
						(1.58)	(0.96)
Constant	0.136***	0.136***	0.138***	0.139***	0.138***	0.140***	0.285
	(7.23)	(7.25)	(7.34)	(3.58)	(7.35)	(7.43)	(0.99)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,771	1,771	1,771	1,771	1,771	1,771	1,771
Adj. R^2	0.130	0.129	0.130	0.309	0.133	0.129	0.287

Note: This table reports the results of the impact of covenant bond intensity on the speed of capital structure adjustment for six types of bond covenant. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. The explanatory variable is the interaction term $Cov_k \times Dev$ (k = 1, 2, 3, 4, 5, 6), where Cov_k denotes the type of bond covenant terms. Specifically, Cov_1 to Cov_6 are dummy variables that equals 1 if there is at least one covenant, respectively, in the (1) option category, (2) restricted asset transfer category, (3) restricted investment category, (4) restricted financing category, (5) event-driven category, and (6) reimbursement arrangement category, or 0 otherwise. In Columns 1–6, each type of bond covenant is included separately, and all covenant categories are included jointly in Column 7. *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. Firm-characteristic variables are measured at the end of the prior year. Year and firm fixed effects are included. We report t-statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

bond covenants, option covenants (Cov_2) and event-driven covenants (Cov_5) provide issuers with greater decision-making power, enhancing a company's flexibility in adjusting its capital structure.

4.3 | Direction of capital structure adjustment

Compared to the speed of downward capital structure adjustment, the speed of upward capital structure adjustment tends to be much slower when firms face high adjustment costs (Chen & Li, 2019; Faulkender

et al., 2012; J. Huang et al., 2014). What, then, is the effect of bond covenants on the speed of adjusting capital structure in different directions? To answer this question, we divide our sample into two groups. One group contains all firms whose capital structures are below their target levels, and the other group consists of all firms whose capital structures are above their target levels. Panel A of Table 6 presents the results. The first two columns provide the regression results for the first group. The coefficient of *Cov* × *Dev* is positive and statistically significant at the 1% level, indicating that companies with more intense bond covenants adjust their capital structures upward at a faster rate. The last two columns provide the regression results for the second group. The coefficient of the interaction term is not significant, offering no evidence that bond covenants accelerate the downward capital structure adjustment when the actual capital structure is higher than the target ratio. We interpret the different findings for the two groups as follows. Firms in China tend to face significant financing constraints (Deng & Zeng, 2014) and the main role of bond covenants is to provide firms with more opportunities for debt financing through positive signals to the capital market. Therefore, bond covenants can effectively facilitate Chinese firms' access to additional funds via the corporate bond market and, in turn, speed up the upward movement of their capital structure. Although we believe that the role of debt retirement may be more pronounced when the bond redemption stage is approaching, we do not explore this possibility in detail. Consistent with Devos et al. (2017), we focus on the impact of bond covenants on the speed of capital structure adjustment during the bond trading stage rather than the redemption stage. In addition, downward adjustments mainly depend on a company's equity financing, which is scarcely affected by bond covenants. Accordingly, bond covenants do not exhibit any significant effect on the downward capital structure adjustment.

4.4 | Methods of upward capital structure adjustment

The preceding findings suggest that bond covenants help firms adjust their capital structure upward. In this section, we investigate the methods of upward capital structure adjustment.

Based on existing studies (Chen & Li, 2019; Hovakimian et al., 2001), we investigate the adjustment methods using two dummy variables: N_1 (increasing debt financing) and N_2 (decreasing equity financing). N_1 is an indicator variable that equals 1 if a company adjusts its capital structure upward by increasing debt financing, and 0 otherwise. Similarly, N_2 equals 1 if a company adjusts its capital structure upward by reducing equity financing, and 0 otherwise. We derive the values of the indicator variables as follows. Equity financing is often reduced through share repurchases. However, for publicly listed firms in China, share repurchases are rare (J. Huang et al., 2014). In addition, due to data availability limitations that prevent us from constructing a sample with a sufficient number of observations, it is not feasible to perform any empirical analyses that employ data on share buybacks. Therefore, we have to employ alternative metrics to proxy for a firm's reduced equity financing. Following J. Huang et al. (2014), we regard a company as adjusting its leverage upward by reducing equity financing when the value of the equation, [Total Equity$_t$ − Total Equity$_{t-1}$] − Net Income$_t$]/Total Assets$_t$, is −5% or lower in a given year.[6] We model these effects in the following equation:

$$P(N_j = 1) = \varnothing\{(\gamma_0 + \gamma_1 Cov_{i,t})Dev + \mu_{i,t}\} \quad (j = 1 \quad \text{or} \quad 2), \tag{7}$$

where the dependent variable is the capital structure adjustment method (either *Increasing debt* or *Decreasing equity*), and the independent variable is $Cov_{i,t} \times Dev$. The coefficient γ_1 of $Cov_{i,t} \times Dev$ indicates the effect of bond covenants on the firm's capital structure adjustment method (J. Huang et al., 2014).

[6]According to Leary and Roberts (2005) and J. Huang et al. (2014), a 5% threshold is used to determine the capital structure adjustment method.

TABLE 6 Effect of bond covenants on the direction and method of capital structure adjustment.

Panel A: Direction of capital structure adjustment				
	Lower than target level		**Higher than target level**	
	(1)	**(2)**	**(3)**	**(4)**
Cov × *Dev*	0.363***	0.400***	0.028	0.018
	(3.64)	(4.08)	(1.27)	(0.78)
Dev	0.341***	1.933	0.365***	0.106
	(4.31)	(1.64)	(7.81)	(0.15)
Constant	0.044	0.053	0.171***	0.169***
	(1.08)	(1.05)	(4.07)	(4.08)
Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	543	543	1,228	1,228
Adj. R^2	0.319	0.347	0.197	0.242
Panel B: Method of capital structure adjustment				
	Increasing debt		***Decreasing equity***	
	(1)	**(2)**	**(3)**	**(4)**
Cov × *Dev*	7.654**	7.899**	0.313	−0.419
	(2.27)	(2.19)	(0.58)	(−0.60)
Dev	−3.665	−4.576*	0.678	−5.807***
	(−1.64)	(−1.75)	(0.43)	(−2.60)
Controls	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Obs.	1,720	1,720	1,771	1,771
Adj. R^2	0.137	0.189	0.151	0.172

Note: Panel A reports the results of the impact of bond covenants on the direction of capital structure adjustment. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. Panel B reports the results of the influence of bond covenants on the method of capital structure adjustment. The dependent variables are two adjustment methods: increasing debt financing and decreasing equity financing. *Increasing debt* is an indicator variable that equals 1 if a company adjusts its capital structure upward by increasing debt financing, and 0 otherwise. Similarly, *Decreasing equity* is an indicator variable that equals 1 if a company adjusts its capital structure upward by reducing equity financing, and 0 otherwise. The main variable of interest in both panels is the interaction term $Cov_{i,t} \times Dev$, where $Cov_{i,t}$ denotes the bond covenant index and *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. Firm-characteristic variables are measured at the end of the prior year. We report *t*-statistics in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Panel B of Table 6 presents the results. The first two columns examine increased debt financing, and the last two columns examine decreased equity financing. The coefficients of $Cov_{i,t} \times Dev$ in the first two columns are positive and statistically significant, suggesting that bond covenants facilitate upward capital structure adjustments mainly by increasing debt financing. We interpret this finding as follows: Bond covenants enhance a firm's ability to obtain additional debt financing and reduce its financing costs, which allows the firm to further increase debt financing and accelerate the upward capital structure adjustment. The coefficients of $Cov_{i,t} \times Dev$ in the latter two columns are insignificant, indicating that bond covenants do not have an effect on a firm's equity financing, despite their explicit constraints on the behaviors of shareholders and management. Overall, the results in this section further support H1a by demonstrating that stricter bond covenants are beneficial for firms, helping them obtain more debt financing. This should increase the speed of upward capital structure adjustments.

4.5 | Robustness tests

4.5.1 | Alternative covenant index metrics

In this section, we perform robustness checks for our baseline results. First, we construct the covenant index using an alternative definition. Specifically, following Shi et al. (2017), we construct the covenant intensity index by first classifying bond covenants into the six categories described in Section 3.1. Next, for a given firm in a given year, we code the value of a category as 1 if at least one covenant term exists in this category, and 0 otherwise. Finally, we sum the values across the six categories and then divide them by 6. If a company does not have any bond covenants in the bond prospectus, the index is 0. Conversely, if a company has bond covenant terms in all six categories, the index is 1.

Table 7 presents the results. We can clearly see that the bond covenant index significantly increases the speed of capital structure adjustment, even after controlling for firm-specific characteristics, and year and firm fixed effects. In Column 3, the coefficient of the bond covenant index is 0.311 (significant at the 1% level). Therefore, the finding that bond covenants accelerate capital structure adjustment holds for an alternative covenant index metric.

4.5.2 | Additional control variables

To reduce any potential biases induced by omitted variables, we delve into prior capital structure studies to further control for compelling factors that can significantly affect a firm's capital structure adjustment speed.

Following Hu and Xu (2021), we consider an array of firm-specific control variables: Altman *Z*-scores (*AZ*) to proxy for bankruptcy risk; nonliquidity ratio (*ILIQ*), which measures a firm's liquidity constraints (ratio of non-current assets to total assets); and natural logarithm of research and development (R&D) investments (*RD*), which gauges a firm's investment in innovation. According to R. Huang and Ritter (2009), historical equity financing cost plays a significant role in shaping a firm's capital structure adjustment speed. We therefore perform a robustness test in which we add the historical equity financing cost (*PEG*), calculated as the cost of equity capital according to the PEG model proposed by Easton (2004), as an additional control variable.[7] Faulkender et al. (2012) emphasize the role of financing constraints; therefore, we add financing constraints (*SA*) as a control variable.

[7] $PEG = \sqrt{(EPS_2 - EPS_1)/P_0}$,
where EPS_1 and EPS_2 are the earnings per share of the current period and the next period, respectively, and P_0 is the closing price of the previous period.

TABLE 7 Impact of bond covenants on the speed of corporate capital structure adjustment (using an alternative bond covenant index).

	(1)	(2)	(3)
Cov × *Dev*	0.354***	0.364***	0.311***
	(4.26)	(4.40)	(3.83)
MTB × *Dev*		−2.161	−1.029
		(−1.32)	(−0.63)
EBIT × *Dev*		0.234	0.365**
		(1.31)	(2.14)
SIZE × *Dev*		0.012	0.004
		(0.32)	(0.10)
PPE × *Dev*		0.013	−0.056
		(0.06)	(−0.24)
DEP × *Dev*		−6.463***	−5.527***
		(−3.56)	(−3.13)
MLEV × *Dev*		−0.046	0.161
		(−0.20)	(0.71)
Dev	0.186*	0.132	0.223
	(1.80)	(0.15)	(0.25)
Constant	0.039***	0.039***	0.136***
	(12.84)	(9.93)	(3.51)
Firm FE	Yes	Yes	Yes
Year FE	No	No	Yes
Obs.	1,771	1,771	1,771
Adj. R^2	0.248	0.281	0.314

Note: This table reports the results of a series of fixed-effect regressions using an alternative bond covenant index as the main explanatory variable. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. The explanatory variable is the interaction term $Cov_{i,t} \times Dev$, where $Cov_{i,t}$ denotes the bond covenant index and *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. We construct the covenant index using an alternative definition. Specifically, following Shi et al. (2017), we construct the covenant intensity index by first classifying bond covenants into the six categories described in Section 3.1. Next, for a given firm in a given year, we code the value of a category as 1 if at least one covenant term exists in this category, and 0 otherwise. Finally, we sum the values across the six categories and then divide them by 6. If a company does not have any bond covenants in the bond prospectus, the index is 0. Conversely, if a company has bond covenant terms in all six categories, the index is 1. Other independent variables are defined in Appendix A. Firm-characteristic variables are measured at the end of the prior year. We report *t*-statistics in parentheses.

*$p < 0.10$; ***$p < 0.01$.

Consistent with Hadlock and Pierce (2010), we use the following formula to calculate *SA*: *SA* = −0.737 × size + 0.043 × size^2 −0.040 × age. Next, according to Lockhart (2014), bank credit lines tend to affect the speed of capital structure adjustment. Hence, we include a company's bank credit line (*CRE*), measured in millions of yuan, as a control variable. Column 1 of Table 8 presents regression results for the model that includes these added

TABLE 8 Robustness tests (adding control variables).

	(1)	(2)	(3)
Cov × *Dev*	0.018**	0.018**	0.020***
	(2.55)	(2.57)	(2.94)
MTB × *Dev*	−2.803	−2.924	−3.719
	(−0.93)	(−0.96)	(−1.15)
EBIT × *Dev*	0.790***	0.807***	0.880***
	(2.70)	(2.73)	(2.96)
SIZE × *Dev*	−0.154	−0.169	−0.177
	(−1.12)	(−1.21)	(−1.29)
PPE × *Dev*	0.021	0.020	0.043
	(0.09)	(0.08)	(0.18)
DEP × *Dev*	−7.081***	−7.192***	−7.430***
	(−3.76)	(−3.86)	(−4.09)
MLEV × *Dev*	0.015	0.003	0.003
	(0.08)	(0.01)	(0.02)
Dev	3.732	4.005	4.237
	(1.42)	(1.50)	(1.61)
AZ × *Dev*	0.012	0.011	0.014
	(0.95)	(0.92)	(1.09)
ILIQ × *Dev*	−0.027	−0.027	−0.032
	(−1.36)	(−1.33)	(−1.52)
RD × *Dev*	−1.367**	−1.370**	−1.481***
	(−2.33)	(−2.35)	(−2.67)
PEG × *Dev*	−0.486*	−0.450	−0.470
	(−1.68)	(−1.49)	(−1.57)
SA × *Dev*	0.096	0.107	0.099
	(0.84)	(0.92)	(0.89)
CRE × *Dev*	−0.000	−0.001	−0.001
	(−0.16)	(−0.34)	(−0.30)
MOT × *Dev*		0.001	0.001
		(0.69)	(0.91)
GDP × *Dev*			0.033
			(1.32)
Constant	0.161***	0.161***	−0.293
	(4.25)	(4.25)	(−1.07)

(Continues)

TABLE 8 (Continued)

	(1)	(2)	(3)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Obs.	1,328	1,328	1,294
Adj. R^2	0.325	0.325	0.316

Note: This table reports the results for a series of robustness tests of the impact of bond covenants on the speed of capital structure adjustment after including additional control variables. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. The main explanatory variable is the interaction term $Cov_{i,t} \times Dev$, where $Cov_{i,t}$ denotes the bond covenant index and *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. Column 1 adds several firm-specific control variables: firm bankruptcy risk measured by Altman's *Z*-score (*AZ*); ratio of noncurrent assets to total assets (*ILIQ*); natural logarithm of research and development (R&D) investments (*RD*); equity financing cost (*PEG*); financial constraints (*SA*), calculated as $SA = -0.737 \times size + 0.043 \times size^2 - 0.040 \times age$ (see Hadlock & Pierce, 2010); and a firm's bank credit line (*CRE*), measured in millions of yuan. Column 2 further considers the market sentiment (*MOT*). Finally, Column 3 adds the provincial economic development proxied by the provincial per capita gross domestic product (*GDP*). Other variables are defined in Appendix *A*. All control variables are measured at the end of the prior year. We report *t*-statistics in parentheses.
$^*p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

control variables. In addition, we include two market-level control variables, market sentiment (*MOT*) and provincial economic development (*GDP*), to mitigate any potential effects arising from macroeconomic factors and regional economic disparities. Column 2 considers market sentiment (*MOT*) as a market-level control variable, and Column 3 adds the provincial economic development proxied by the provincial per-capita gross domestic product (*GDP*).

We can see in Table 8 that the relation between the bond covenant index and the speed of capital structure adjustment remains positive and statistically significant in all three specifications. Thus, these robustness tests support our earlier finding that more intense bond covenants accelerate capital structure adjustment.[8]

4.5.3 | Endogeneity

To alleviate potential endogeneity problems caused by mutual causality, we implement an instrumental variable regression. Specifically, we follow Fisman and Svensson (2007) and Hasan and Uddin (2022) and use the average number of bond covenant terms within a firm's industry as the first instrumental variable. La Porta et al. (1998) point out that common law (civil law) countries have the strongest (weakest) legal protection for investors. Compared to Western nations, China's legal institutions developed late, and Chinese contract law (as well as its enforcement) is relatively weak. In addition, religious beliefs and legal covenants play a supplementary role in China. Thus, in places with a stronger religious tradition, legal contract requirements tend to be less stringent. Following Hilary and Hui (2009) and Yu et al. (2021), we use religious culture, measured by the number of

[8]We are thankful to an anonymous reviewer for pointing out that the inclusion of a separate constant term alongside firm fixed effects in our adjustment speed regression may raise the specter of multicollinearity, as the deviation term in the adjustment speed regressions represents the constant term for adjustment speed. As a further robustness check, we thus reestimated our regressions and suppressed the constant term. The results remain qualitatively unchanged. We report the empirical results in Appendix B. Furthermore, we checked the variance inflation factors (VIFs) for all regressions pertaining to the capital structure adjustment speed and found that the vast majority of VIF values are below 5 and only a few are between 5 and 10. Thus, multicollinearity is unlikely to pose any significant concerns in our multivariate context.

temples within a 100-kilometer radius of a firm's headquarters, as a second instrumental variable. The industry average number of bond covenants and number of temples both meet the requirement that the instrumental variable has an impact on the endogenous variable but is unlikely to have an impact on the dependent variable. In the first stage, we regress the bond covenant index on (1) the mean bond covenant index for the industry in which the firm operates, (2) the number of temples in the firm's vicinity, and (3) the control variables. We then use the predicted value of the bond covenant index obtained from the first-stage regression to form the explanatory variable ($Cov_{i,t} \times Dev$) for the second-stage regression.[9]

Table 9 presents the results of the second-stage regression. Our estimations do not suffer from weak instruments (Cragg–Donald Wald *F*-statistic has a *p*-value of less than 0.001) or from overidentification (Hansen *J*-statistics are insignificant in all models). When using the industry average bond covenant index and number of temples as instrumental variables, the relation between the bond covenant index and a company's capital structure adjustment speed is still positive and significant.[10]

4.5.4 | Heterogeneity analysis

In this section, we determine whether the relation between the bond covenant index and the capital adjustment speed differs depending on (1) the legal environment in which a firm operates, (2) the nature of the firm's ownership, and (3) financial constraints. A bond covenant is a legally binding agreement between the issuer of the bond and the creditors (Chava et al., 2019). Therefore, the legal environment that governs the bond covenant may affect the restrictive power and enforcement of the bond covenant. A sound legal environment should encourage strict adherence to the requirements of the bond covenant, which would safeguard the interests of creditors and effectively constrain a firm's insiders (Demirgüç-Kunt & Maksimovic, 1998; Madhani, 2016). This should, in turn, reduce the cost of adjusting a firm's capital structure. Strict bond covenants should thus have a more pronounced effect on the speed of adjustment for firms whose headquarters are located in areas with sound legal environments than for firms located in areas with poor legal environments. Although China has a unified legal system, there are large differences in the legal protection of investors in different provinces, as well as in the degree to which such laws are enforced. In the analysis that follows, we measure the strength of the legal environment by the local legal environment index in the area where the company is located in China and split the sample into two groups based on the median value. This indicator was constructed by the National Economic Research Institute of the China Reform Foundation and the Chinese Entrepreneur Survey System. It includes data from 29 provinces, autonomous regions, and municipalities directly under the central government, and has been widely used in many academic studies in China.

Ownership status may also modulate the effect of bond covenants. Chinese SOEs have the image of being semi-political organizations with noneconomic aims (Bai et al., 2000) and severe agency problems (La Porta et al., 2002). A large body of literature finds that SOEs are more opaque than other types of firms (Bushman et al., 2004; J. Li et al., 2019; Wang et al., 2008). Bond covenants improve the external information disclosure of SOEs, thereby helping to improve corporate information transparency and facilitating capital structure adjustment. We believe that we should not only examine the reliance on bond covenants for SOEs and non-SOEs but also investigate whether the positive signaling effect of bond covenants can be effectively delivered by SOEs and non-SOEs. Specifically, given the close political ties between SOEs and the Chinese government, SOE debt is implicitly guaranteed by the government. These implicit government guarantees may increase the credibility of bond covenants. In addition, because SOEs operate under strict supervision of the Chinese government, the government

[9]The results of the first-stage regression analysis are available upon request. The first-stage *F*-test yields an *F*-value of 117.59, which is greater than 10—a value Staiger and Stock (1997) suggest as a benchmark value for weak instruments. Thus, we reject the null hypothesis that the instrument is weak.
[10]To reduce heteroskedasticity problems, we add 1 to the number of temples and then compute the natural logarithm.

TABLE 9 Impact of bond covenants on the speed of corporate capital structure adjustment (instrumental variable analysis).

	(1)	(2)	(3)
$Cov_{predicted}$ × *Dev*	0.180**	0.459***	0.471**
	(2.29)	(2.61)	(2.37)
MTB × *Dev*		2.729	2.398
		(1.60)	(1.46)
EBIT × *Dev*		0.145	0.117
		(0.55)	(0.49)
SIZE × *Dev*		−0.076***	−0.078***
		(−2.75)	(−2.65)
PPE × *Dev*		0.241**	0.061
		(2.37)	(0.57)
DEP × *Dev*		−3.801***	−3.343***
		(−2.97)	(−2.61)
MLEV × *Dev*		0.262**	0.299**
		(2.11)	(2.17)
Dev	−0.007	1.490***	1.570***
	(−0.14)	(2.71)	(2.69)
Constant	0.019***	0.090**	0.077
	(10.46)	(2.40)	(1.50)
Industry FE	No	No	Yes
Year FE	No	Yes	Yes
Obs.	1,732	1,732	1,732
Adj. R^2	0.023	0.132	0.180

Note: This table reports the results of an instrumental variable analysis. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. The explanatory variable is the interaction term $Cov_{predicted}$ × *Dev*, where $Cov_{predicted}$ denotes the predicted value of the bond covenant index obtained from a regression in which the instrumental variables are the annual industry mean of the covenant index and the natural logarithm of the number of religious temples within a 100-kilometer radius of a firm's headquarter plus 1. *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. Other independent variables are defined in Appendix A. Firm-characteristic variables are measured at the end of the prior year. We report *t*-statistics in parentheses. **$p < 0.05$; ***$p < 0.01$.

may force bond-issuing companies to strictly comply with those bond covenants (S. Li & Wu, 2022). Hence, bondholders may be confident that these issuing firms are capable of fulfilling the covenants. Therefore, the positive effect of the bond covenant index on a firm's capital structure adjustment speed should be more pronounced for SOEs than for non-SOEs.

Table 10 presents the results of the heterogeneity analysis pertaining to both the legal environment and the nature of ownership. Panel A examines the relation between bond covenants and the speed of capital structure adjustment under different legal environments. According to the median value of an index representing the legal

TABLE 10 Heterogeneity analysis based on the legal environment and ownership nature.

Panel A: Legal environment				
	Good legal environment		**Poor legal environment**	
	(1)	**(2)**	**(3)**	**(4)**
Cov × *Dev*	0.063***	0.042*	0.093	0.021
	(3.08)	(1.87)	(1.56)	(0.36)
Dev	0.535***	0.533***	0.366***	0.407***
	(6.50)	(6.03)	(6.29)	(6.74)
Constant	0.049***	0.083***	0.036***	0.151***
	(9.33)	(4.43)	(12.67)	(4.28)
Controls	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Obs.	953	953	801	801
Adj. R^2	0.311	0.344	0.225	0.280
Panel B: Ownership nature				
	SOEs		**Non-SOEs**	
	(1)	**(2)**	**(3)**	**(4)**
Cov × *Dev*	0.077***	0.048*	0.059	0.007
	(3.44)	(1.86)	(1.54)	(0.17)
Dev	0.269***	0.293***	0.518***	0.532***
	(5.09)	(4.80)	(6.12)	(5.39)
Constant	0.029***	0.136***	0.045***	0.111***
	(7.65)	(2.82)	(11.42)	(10.55)
Controls	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Obs.	895	895	776	776
Adj. R^2	0.130	0.160	0.331	0.395
Panel C: Financing constraints				
	Low financing constraints		**High financing constraints**	
	(1)	**(2)**	**(3)**	**(4)**
Cov × *Dev*	−0.040	−0.025	0.026***	0.020**
	(−0.81)	(−0.48)	(4.72)	(2.22)
Dev	0.548***	1.180	0.446***	1.205
	(6.22)	(0.69)	(3.66)	(1.03)

(Continues)

TABLE 10 (Continued)

Panel C: Financing constraints				
	Low financing constraints		High financing constraints	
	(1)	(2)	(3)	(4)
Constant	0.033***	0.084***	0.051***	0.155***
	(16.62)	(11.54)	(4.70)	(2.76)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Obs.	869	869	902	902
Adj. R^2	0.257	0.318	0.258	0.341

Note: This table reports the results of a heterogeneity analysis. Panel A reports the results for the impact of bond covenants on the speed of capital structure adjustment with respect to the legal environment in which a firm operates, and Panel B reports the results for the firm's ownership nature. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. Specifically, in Panel A, we form subsamples of our dataset by distinguishing between firms that operate in a good versus poor legal environment (based on median legal environment by province), and in Panel B, we divide the sample into state-owned enterprises (SOEs) and non-SOEs (based on the nature of the company's equity). In Panel C, we form subsamples of our dataset by distinguishing between firms that operate under low or high financial constraints (based on the median value of financial constraints), where financial constraints (*SA*) are calculated as $SA = -0.737 \times size + 0.043 \times size^2 - 0.040 \times age$ (see Hadlock & Pierce, 2010). The variable of interest is the interaction term $Cov_{i,t} \times Dev$, where $Cov_{i,t}$ denotes the bond covenant index and *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. Other independent variables are defined in Appendix A. Firm-characteristic variables are measured at the end of the prior year. We report *t*-statistics in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

environment, we divide the companies into two subsamples based on whether they fall above or below this value. The results show that the coefficient of *Cov* × *Dev* is positive and statistically significant for firms located in areas with better legal environments, whereas the effect of bond covenants on the speed of capital structure adjustment is not significant for firms located in areas with poor legal environments. These results reveal that a stronger legal environment allows bond covenants to play a greater role in restricting firms' behaviors. Panel B presents the results pertaining to the nature of corporate ownership. We can see that the *Cov* × *Dev* coefficients are significant in the SOE subsample but not in the non-SOE sample. This suggests that the government's involvement in (and support for) SOEs may strengthen the positive signaling and regulating roles of bond covenants, thus speeding up the capital structure adjustments of these firms.

Covenants convey a positive governance signal, thereby improving a firm's capital-raising capacity. It is plausible that this signaling effect is particularly important for financially constrained firms. To test this notion, we employ the SA index (Hadlock & Pierce, 2010) to proxy for the degree of corporate financial constraints and split the sample into two groups based on the median value of the SA index ($SA = -0.737 \times size + 0.043 \times size^2 - 0.040 \times age$). The first group includes firms with a low level of financial constraints (SA index below the median), and the second group includes firms with a high level of financial constraints (SA index above the median). Panel C of Table 10 presents the results pertaining to the impact of financial constraints on firms in the two subsamples. We can see that the coefficients of *Cov* × *Dev* are only statistically significant for the firms whose SA index is above the median. This suggests that the positive influence of corporate bond covenants on the speed of capital structure adjustment is indeed amplified in high financially constrained firms.

4.6 | Exploring potential mechanisms

In this section, we explore two potential mechanisms by which bond covenants may affect the speed of capital structure adjustment. Specifically, we postulate that the ability of bond covenants to provide a positive signaling effect and impose regulatory constraints on firms with public debt issuance should be closely related to the firm's levels of (1) information transparency, (2) internal control, and (3) environmental, social, and governance (ESG) performance.

A high level of information transparency can alleviate corporate information asymmetry and agency problems (Graham & Harvey, 2001). Improvements in corporate information transparency can encourage bond issuers to deliver a positive signal to the capital market and assure creditors that they are effectively protected by bond covenants (An et al., 2015). Such improvements can also help creditors identify and accept positive information about a company, thereby reducing adverse selection costs, alleviating the creditor's information disadvantage, and enhancing their confidence. These benefits may, in turn, enhance a company's financing flexibility in the bond market and ameliorate dynamic capital structure adjustments (Hedge et al., 2023).

To reduce moral hazard problems linked to the behavior of a firm's insiders, the terms of strict bond covenants set clear behavioral constraints on a company's shareholders and management. However, the extent to which covenants can play a regulatory and binding role for a company may depend on its degree of internal control. Good internal control increases the likelihood that corporate insiders will strictly comply with the covenants, and thus it should reduce both corporate insiders' moral hazard and creditors' investment risk (Zhen et al., 2019). This should, in turn, mitigate the cost of adjusting the capital structure of the firm (Valta, 2012) and increase the speed of adjustment.

In this section, we test whether these two channels—information transparency and internal control—function as mechanisms by which bond covenants affect speed of capital structure adjustment. The model we use is provided as follows:

$$\Delta Lev_{i,t} = (\gamma_1 Cov_{i,t} + \gamma_2 Cov_{i,t} \times Z_{i,t} + \gamma_3 Z_{i,t}) Dev + \mu_{i,t}, \tag{8}$$

where Z denotes the moderating variable, that is, the company's level of information transparency or its degree of internal control. Our interest is in the sign and significance of the coefficient γ_2 of $Cov_{i,t} \times Z_{i,t}$.

4.6.1 | Information transparency channel

We first examine the role of information transparency in mediating the relation between bond covenants and the speed of corporate capital structure adjustment. Following the US studies by Amihud (2002) as well the Chinese studies by G. Li et al. (2014), we use the information illiquidity ratio to measure information transparency.[11] A higher value of the information illiquidity ratio implies less information transparency, and vice versa. Accordingly, we expect the coefficient of the interaction term to be negative, indicating that a high degree of information transparency strengthens the positive effect of bond covenants on a firm's capital structure adjustment speed. Panel A of Table 11 presents the results. It can be seen that the coefficient

[11]The average ratio of daily absolute trading volume to the day's trading volume is given as:

$$ILL = 1/D_{i,y} \frac{\sum_{i=1}^{D_{i,y}} |R_{i,y,d}|}{VOLD_{i,y,d}} \text{(information illiquidity index)},$$

where $R_{i,y,d}$ is the return of stock i on day d in year y, $VOLD_{i,y,d}$ is the trading volume on the day, and $D_{i,y}$ is the number of days for which data are available for stock i in year y (Amihud, 2002).

TABLE 11 Exploring potential mechanisms.

Panel A: Information transparency channel		
	(1)	**(2)**
Cov × *Dev*	0.228***	0.223***
	(5.86)	(5.12)
Z × *Cov* × *Dev*	−27.277**	−31.389**
	(−2.13)	(−2.26)
Z × *Dev*	9.794**	11.233**
	(2.19)	(2.30)
Constant	0.023***	0.101*
	(7.64)	(1.84)
Controls	No	Yes
Year FE	No	Yes
Firm FE	Yes	Yes
Obs.	1,274	1,274
Adj. R^2	0.162	0.172
Panel B: Corporate internal control channel		
	(1)	**(2)**
Cov × *Dev*	0.250***	0.102***
	(5.19)	(2.64)
Z × *Cov* × *Dev*	0.116***	0.047**
	(3.74)	(2.43)
Z × *Dev*	0.056***	0.033***
	(9.32)	(4.14)
Constant	0.033***	0.064***
	(16.29)	(6.83)
Controls	No	Yes
Year FE	No	Yes
Firm FE	Yes	Yes
Obs.	1,729	1,729
Adj. R^2	0.270	0.125

Panel C: ESG performance channel								
	ESG		**Environmental**		**Social**		**Corporate governance**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Cov × *Dev*	0.853***	0.019**	−2.189	0.017*	0.596**	0.009*	0.904***	0.016*
	(3.11)	(2.18)	(−1.08)	(1.88)	(2.57)	(1.68)	(3.34)	(1.70)

TABLE 11 (Continued)

Panel C: ESG performance channel								
	ESG		Environmental		Social		Corporate governance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG × *Dev*		0.004*						
		(1.70)						
Environmental × *Dev*				−0.000				
				(−0.26)				
Social × *Dev*						−0.001		
						(−0.69)		
Governance × *Dev*								0.002*
								(1.77)
Dev	−81.476***	1.381	−60.020**	1.209	−55.705***	−0.063	−127.475***	1.558
	(−5.88)	(1.28)	(−2.55)	(1.14)	(−4.93)	(−0.26)	(−8.87)	(1.43)
Constant	1.017**	0.033***	1.012	0.080**	0.554	0.057**	1.501**	0.079**
	(2.41)	(7.75)	(1.49)	(2.30)	(1.15)	(2.16)	(2.28)	(2.24)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,354	1,354	1,347	1,347	1,353	1,353	1,354	1,354
Adj. R^2	0.855	0.221	0.241	0.236	0.574	0.058	0.860	0.245

Note: This table explores potential channels through which bond covenants affect a firm's capital structure adjustment speed. Panel A reports results for the information transparency channel, and Panel B reports results for the corporate internal control channel. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. The variable of interest is the interaction term $Cov_{i,t} \times Dev$, where $Cov_{i,t}$ denotes the bond covenant index and *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. *Z* denotes the moderating variable, that is, the information transparency channel and corporate internal control channel in Panels A and B, respectively. Panel C presents results pertaining to the environmental, social, and governance (ESG) performance channel. Columns 1, 3, 5, and 7 examine the impact of bond covenants on a firm's overall ESG performance, environmental performance, social performance, and corporate governance, respectively. The main explanatory variable in each model is the bond covenant index. Columns 2, 4, 6, and 8 explore the effect of bond covenants and corporate ESG performance—including its components—on a firm's capital structure adjustment speed. Specifically, the four columns test how a firm's capital structure adjustment speed is affected by bond covenants and the firm's overall ESG performance (Column 2), bond covenants and corporate environmental performance (Column 4), bond covenants and social performance (Column 6), and bond covenants and corporate governance performance (Column 8). The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. Firm-characteristic variables are measured at the end of the prior year. We report *t*-statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

of $Z \times Cov \times Dev$ is negative and statistically significant. This is in line with the hypothesis that a high degree of information transparency can reduce information costs and raise awareness within the capital market about the company's quality, which can enable bondholders to receive the positive signals sent by the bond covenants.

4.6.2 | Internal control channel

We now examine the effect of corporate internal control on the link between bond covenants and the speed of capital structure adjustment. We use the Diebold Corporate Control Index to proxy for the quality of a firm's internal control.[12] Higher values of this index represent better corporate internal control. We expect the coefficient of the interaction term of interest ($Z \times Cov \times Dev$) to be positive. Panel B of Table 11 shows that the coefficients of the interaction term in Columns 1 and 2 are indeed positive and statistically significant. This implies that the positive effect of bond covenants on the capital structure adjustment speed is more pronounced in firms with better corporate internal control.

4.6.3 | ESG performance channel

Previous research has emphasized the impact of a firm's ESG performance on the pace of corporate capital structure adjustment (Adeneye et al., 2023; Cantino et al., 2017).[13] The behavioral norms and constraints imposed by bond covenants on a firm may affect the company's ESG performance, which may accordingly affect the speed of corporate capital structure adjustment. To address this issue, we collect ESG ratings for our sample firms from Bloomberg. We first examine the influence of a firm's overall ESG score and then the individual impact of each of the three ESG components (environmental, social, and governance) on the firm's capital structure adjustment speed.[14]

Panel C of Table 11 presents empirical results pertaining to the ESG performance channel. Columns 1 and 2 examine the impact of bond covenants on corporate ESG performance, and of bond covenants and ESG performance on the speed of capital structure adjustment. The results show that bond covenants can significantly ameliorate a company's ESG performance and that good ESG performance can facilitate a firm's capital structure adjustment speed. Columns 3 and 4 test the impact of bond covenants on corporate environmental performance, and the impact of bond covenants and corporate environmental performance on the speed of corporate capital structure adjustment. There is no evidence that bond covenants improve corporate environmental performance. Columns 5 and 6 test the impact of bond covenants on corporate social performance, and the impact of bond covenants and corporate social performance on the speed of capital structure adjustment. The results show that bond covenants indeed improve corporate social performance, but there is no evidence that improved social performance increases the speed of capital structure adjustment. Columns 7 and 8 examine the impact of bond covenants on corporate governance quality, and the impact of bond covenants and corporate governance on the speed of capital structure adjustment. The results show that bond covenants significantly improve overall corporate governance, which is conducive to accelerating the firm's capital structure adjustment. In summary, it is evident that the use of bond covenants can enhance a company's ESG performance, primarily by elevating the company's social and governance performance, and that the improved ESG performance can translate into accelerated capital structure adjustment.

5 | CONCLUSION

The Chinese bond market is an emerging market; it has a relatively short history and has yet to mature as compared with the public debt markets of more developed countries. Because of its immature characteristics, the Chinese corporate bond market had been tied to a "zero-default myth" for many years (Schweizer et al., 2023), which caused

[12]The index is constructed based on five dimensions of internal control: corporate strategy execution, information disclosure, operating returns, operating legitimacy requirements, and asset security. See Diebold (http://www.dibdata.com.cn/index.html) for more details.

[13]A firm's ESG score measures its performance in environmental, societal, and corporate governance aspects. The environmental aspect covers energy consumption, pollution prevention, and climate change; the social aspect covers labor rights, product responsibility, supply chain management, and social responsibility; and the corporate governance aspect covers governance structure and governance mechanisms.

[14]Data come from the Bloomberg database: https://www.bloombergchina.com/solution/data-content/reference-data/.

market participants to pay insufficient attention to the constraining and protective roles of bond covenants. However, following the evaporation of the zero-default myth as a consequence of a series of defaults in China in recent years, there is now greater recognition that stricter bond covenants are more conducive to the protection of creditors' rights. Nevertheless, before the current study, it had not been determined whether the protections provided by bond covenants are able to facilitate the dynamic adjustment of the capital structure of bond issuing companies and, in turn, stabilize firms' leverage and mitigate their overall financial risks.

In this article, we use manually collected bond covenant information from the bond-issuing prospectuses of Chinese listed companies between 2007 and 2019 to construct a bond covenant intensity index. We then use this index to examine the impact of bond covenants on the speed of corporate capital structure adjustment. Our analysis generates findings that differ from those of studies conducted in developed countries; specifically, we show that stricter bond covenants significantly increase the speed of dynamic capital structure adjustment for Chinese listed firms. The findings also show that the positive effects of bond covenants vary across different categories of bonds: For option covenants, restrictive asset transfer covenants, restrictive investment covenants, and event-driven covenants, bond covenant intensity is positively related to the speed of capital structure adjustment, whereas for restrictive financing covenants and repayment arrangement covenants, there are no such significant effects. We further investigate the direction and methods of capital structure adjustment for bond-issuing firms and find that bond covenants facilitate a company's upward capital structure adjustment through additional debt financing. Bond covenants also have a more pronounced positive effect on the capital structure adjustment speed in SOEs and companies headquartered in areas with superior legal environments. Finally, we examine the potential channels through which bond covenants exercise their effect on capital structure adjustment. Our analysis suggests that debt covenants enhance the speed of capital structure adjustment through channels linked to information transparency, corporate internal control, and ESG performance.

Our findings have important policy implications. Strict bond covenants not only reduce the risk of corporate bond defaults and protect the interests of creditors but also increase a bond-issuing firm's financial flexibility, allowing for a quicker adjustment of its corporate capital structure in response to dynamic changes in the capital market. This is conducive to realizing the Chinese government's policy objectives of stabilizing the leverage of domestic firms and reducing systemic risk in the capital market. Policymakers should also make efforts to improve the information disclosure systems of listed companies by improving relevant policies, introducing stricter enforcement, and encouraging more robust legal environments. Together, such improvements should allow bond covenants to play a more effective role. Given the significant benefits of strict bond covenants, bond issuers should optimize the design of bond covenants, improve the transparency of company information, and enhance corporate internal control. A greater intensity of covenants can alleviate the conflict of interests between creditors and shareholders as well as between creditors and firm management, and in turn reduce the risk faced by creditors. Given the recent rise in bond defaults in China, bond investors would be well advised to identify better qualified bonds by examining each bond's covenants and assessing their effect on the risk of bond defaults including, as our study shows, a firm's ability to flexibly adjust its capital structure. At the same time, bondholders should pay attention to the constraining effect of bond covenants on bond-issuing firms to better protect their pecuniary interests and legal rights.

It is worth noting that the discrepancy between our findings and those of Devos et al. (2017) may be attributed to the different institutional environments in the United States and China. China's corporate bond market is still young, its political system is vastly different from Western countries, and it exhibits many traits that are unique to emerging market economics. This likely influences the role of bond covenants in China. In addition, it is necessary to pay attention to the way in which the capital structure adjustment speed is calculated. As indicated by Yin and Ritter (2020), the current proxies for leverage adjustment suffer from biases. Specifically, proxying for capital structure adjustment with the market value of debt may lead to upward biases when estimating the speed of leverage adjustment due to stock price fluctuations, while gauging leverage adjustments with the book value of debt can also lead to biased estimates since firm growth effects (where the growth of assets is the denominator in the book debt ratio) can falsely appear as a capital structure adjustment. Hence, in future research on the speed of capital

structure adjustment, it may be advisable to develop a novel metric that is immune to stock price fluctuations and firm growth effects to overcome potential estimation biases.

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APPENDIX A

Table A1

TABLE A1 Variable definitions.

Variable	Definition	Source
ΔLev	Difference between a firm's prior-year capital structure and its current-period capital structure, where capital structure is calculated as the ratio of total liabilities to total assets	China Stock Market & Accounting Research (CSMAR) database
Dev	Difference between a firm's prior-year capital structure and its target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is calculated using Equation (2) and $Lev_{i,t-1}$ denotes the firm's capital structure at the end of the previous period	CSMAR database
Cov	Annual corporate bond covenant index, calculated using Equation (5)	Manually collected from bond prospectuses, retrieved from the Wind Database
MTB	Market value of equity over book value of equity	CSMAR database
Q	Sum of the market value of equity and the book value of debt divided by the sum of the book value of equity and the book value of debt	CSMAR database
EBIT	Earnings before interest and tax, scaled by total assets	CSMAR database
SIZE	Natural logarithm of the book value of total assets	CSMAR database
PPE	Net fixed assets over total assets	CSMAR database
DEP	Depreciation of fixed assets over total assets	CSMAR database
MLEV	Industry median debt ratio	CSMAR database
AZ	Firm bankruptcy risk, measured by Altman Z-scores	CSMAR database
ILIQ	Ratio of noncurrent assets to total assets	CSMAR database
RD	Natural logarithm of research and development (R&D) investment	CSMAR database
PEG	Equity financing cost: $PEG = \sqrt{(EPS_2 - EPS_1)/P_0}$, where EPS_1 and EPS_2 are the earnings per share of the current period and the next period, respectively, and P_0 is the closing price of the previous period	CSMAR database
SA	Financing constraints. We follow Hadlock and Pierce (2010) and use the following formula to calculate corporate financing constraints (*SA*): $SA = -0.737 \times size + 0.043 \times size^2 - 0.040 \times age$	CSMAR database
CRE	Company's bank credit line	CSMAR database
MOT	Investor market sentiment index	CSMAR database
GDP	Provincial per capita gross domestic product	CSMAR database

(Continues)

TABLE A1 (Continued)

Variable	Definition	Source
Information transparency	$ILL = 1/D_{i,y}\frac{\sum_{i=1}^{D_{i,y}}\lvert R_{i,y,d}\rvert}{VOLD_{i,y,d}}$ (information illiquidity index), the average ratio of daily absolute trading volume to the day's trading volume, where $R_{i,y,d}$ in $\frac{\lvert R_{i,y,d}\rvert}{VOLD_{i,y,d}}$ is the return of stock i on day d in year y, $VOLD_{i,y,d}$ is the trading volume on the day, and $D_{i,y}$ is the number of days for which data are available for stock i in year y (Amihud (2002))	CSMAR database
Corporate internal control	Index is constructed based on five dimensions of internal control: corporate strategy execution, information disclosure, operating returns, operating legitimacy requirements, and asset security	DIB database (http://www.dibdata.com.cn/index.html)
ESG performance	Company's score on environmental, social, and corporate governance performance	Bloomberg (China) database https://www.bloombergchina.com/solution/data-content/reference-data/

APPENDIX B

Table B1

TABLE B1 Further robustness test (excluding the constant term).

	(1)	(2)
Cov × *Dev*	0.013**	0.020**
	(2.31)	(2.07)
MTB × *Dev*	0.694	−3.719**
	(0.33)	(−2.30)
EBIT × *Dev*	0.123	0.880***
	(0.48)	(3.39)
SIZE × *Dev*	−0.184***	−0.177
	(−2.96)	(−1.60)
PPE × *Dev*	0.132	0.043
	(1.53)	(0.27)
DEP × *Dev*	−2.051**	−7.430***
	(−2.08)	(−4.85)
MLEV × *Dev*	0.243*	0.003
	(1.71)	(0.02)
RD × *Dev*	−0.764***	−1.481***
	(−2.83)	(−3.04)

TABLE B1 (Continued)

	(1)	(2)
ILIQ × *Dev*	0.004	−0.032**
	(0.21)	(−2.00)
AZ × *Dev*	0.007	0.014*
	(0.64)	(1.79)
GDP × *Dev*	−0.010**	0.033
	(−2.11)	(1.31)
PEG × *Dev*	−0.001	0.001
	(−0.61)	(0.98)
SA × *Dev*	0.112***	0.099
	(2.60)	(1.15)
MOT × *Dev*	−0.488*	−0.470
	(−1.74)	(−1.52)
CRE × *Dev*	0.001	−0.001
	(0.23)	(−0.35)
Dev	3.719***	4.237**
	(3.05)	(2.02)
Year FE	Yes	Yes
Industry FE	Yes	No
Firm FE	No	Yes
Obs.	1,294	1,294
Adj. R^2	0.131	0.321

Note: This table reports the results of a sensitivity analysis in which we estimate the impact of bond covenants on the speed of capital structure adjustment without the constant term. The dependent variable is ΔLev, which is the difference between the current-period capital structure and the prior-period capital structure. The main explanatory variable is the interaction term $Cov_{i,t}$ × *Dev*, where $Cov_{i,t}$ denotes the bond covenant index and *Dev* denotes the difference between the capital structure in the previous period and the target capital structure ($Lev^*_{i,t} - Lev_{i,t-1}$), where $Lev^*_{i,t}$ is estimated using a generalized method of moments (GMM) model. Other independent variables are defined in Appendix A. All control variables are measured at the end of the prior year. We report *t*-statistics in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.