Journal of Financial Economics 144 (2022) 328–346

Contents lists available at ScienceDirect

Journal of Financial Economics

journal homepage: www.elsevier.com/locate/jfec

Issuance overpricing of China's corporate debt securities ☆

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ARTICLE INFO

Article history:
Received 29 January 2020
Revised 19 April 2021
Accepted 14 May 2021
Available online 15 June 2021

JEL classifications:
G12
G14
G24

Keywords:
Overpricing
New issues
Corporate debt securities
Chinese market

ABSTRACT

We document issuance overpricing of corporate debt securities in China, which is robust across subsamples with different credit ratings, maturities, and issuers. This phenomenon contrasts with underpricing of equity and debt securities in Western countries and reflects China's distinct institutional environment. The average overpricing dropped from 7.44 basis points to 2.41 basis points after the government prohibited underwriters from using rebates in issuances in October 2017. By analyzing overpricing before and after the rebate ban and across different issuers and underwriters, we uncover two channels for underwriters, who compete for future underwriting business, to drive up overpricing: rebates and self-purchases.

1. Introduction

Due to the Chinese government's efforts to liberalize financial markets, China's corporate debt-security market has grown rapidly in recent years. According to SIFMA (https://www.sifma.org) and the Asian Development Bank (https://asianbondsonline.adb.org), by the end of 2019, outstanding corporate debt securities in China reached 4.3 trillion USD, making it the second-largest market of corporate debt securities in the world, just behind the U.S., with 10.6 trillion USD.[1] China's corporate debt-security market is different from the more developed U.S. market in several ways, as reviewed by Amstad and He (2020). First, it directly grew out of China's banking sector and features banks as its major investors and underwriters. Consequently, issuance of debt securities directly competes with bank loans for firms' financing needs. Second, debt securities issued in this market are mostly commercial paper and medium-term notes with an average maturity of 1.74 years, which is substantially shorter than maturities in the U.S. market. Third, debt securities in China tend to be issued by large firms with credit ratings highly skewed to the upside and artificially low default rates, which possibly reflects the government's tight control on issuances, as well as implicit government guarantees to avoid public defaults.[2] These differences make studying how pricing and

☆ We thank workshop participants at the Chinese University of Hong Kong, Shenzhen, Five Star Conference in Beijing, Nanjing University Business School and Tsinghua PBC School of Finance for helpful comments and suggestions. We are grateful for constructive comments from G. William Schwert (the Editor) and two referees. Jinfan Zhang acknowledges support from the National Natural Science Foundation of China (Project Number 71,733,004). The paper was previously circulated under the title "Overpricing in China's Corporate Bond Market."

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[1] The number for the United States includes both outstanding corporate bonds and commercial paper.

[2] These differences are partly due to the gradual process of China's economic and financial reforms and partly reflect the different model used

https://doi.org/10.1016/j.jfineco.2021.06.010
0304-405X/

market dynamics in China's newly developed and rapidly growing market of corporate debt securities may be different from that in other countries particularly interesting and important.

In this paper, we focus on the issuance pricing of debt securities in China's interbank market, which accounts for about 90% of debt securities issued in China in recent years.[3] We collect a comprehensive data set of 18,229 debt securities issued by 2,558 nonfinancial firms in 2015–2019 in the interbank market, including both initial and seasoned offerings. We uncover strong evidence of issuance overpricing: the yield spread of a debt security on the day of its first secondary-market trade is, on average, 4.9 basis points (bps) higher than its yield spread at the issuance, relative to the yield of a Treasury security with similar maturity.[4] This overpricing is robust across debt securities with different characteristics, such as initial or seasoned offering, maturity, and underwriter type, and across issuers with different attributes, such as credit rating, size, and state ownership.

This issuance overpricing is in sharp contrast to the typical observations of issuance underpricing of both equity and debt securities in the U.S. and other countries. See Lowry et al. (2017) for a review of the extensive evidence of underpricing in equity initial public offerings (IPOs). Although the literature on the issuance pricing of corporate debt securities, which we review later, is less conclusive, it mostly finds evidence of underpricing of corporate debt securities in developed economies.

The pervasive issuance overpricing reflects the different institutional environment in China and thus offers a window to examine the second-largest market for corporate debt securities in the world. In this market, banks with ample investment capital act as both underwriters and investors to compete for the issuances of large firms with relatively low default risks. Interestingly, they compete on issuance pricing. Note the secondary market for debt securities tends to be highly illiquid, which makes the secondary-market price more manipulable and thus less reliable than the issuance price. The illiquidity of the secondary market also makes new issues more appealing to investors than purchases in the secondary market despite the issuance overpricing. By contrast, the issuance price is not only more reliable than the secondary-market price, despite the issuance overpricing, but also regularly available to the public. Due to the short maturities in China's debt-security market, most firms need to repeatedly issue debt securities. As a result, higher pricing not only reduces the issuer's financing cost of the current issuance, but also provides a publicly observed benchmark for the issuer's other debt financing, such as bank loans. The benchmark role of the issuance price thus induces an issuer to reward its future issuance to its current underwriter based on issuance pricing, rather than on price stability in the secondary market or on the underwriting fee. Consistent with this incentive, we find evidence in the data that a lower yield spread in the issuance (i.e., higher pricing) predicts a higher probability of the issuer's retention of its current underwriter for its subsequent issuance.

How do underwriters generate overpricing? The interbank market in China offers different channels for the underwriter to influence the pricing. In the U.S., a syndicate allocates the issuance of a corporate bond among potential investors and usually sets the offering price below the level that is expected to prevail in secondary-market trading to induce investors to reveal their demand. Furthermore, the syndicate assumes the obligation to stabilize the issuance in the secondary market should demand prove to be weaker than expected, as discussed in Bessembinder et al. (2020). In contrast, the issuance of corporate debt securities in China entails a single-price auction in which the underwriter and other qualified institutions directly bid the issuance for themselves or their clients. The underwriter does not allocate the issuance and instead serves to organize the auction and contact potential investors to participate in it. Furthermore, the underwriter is not obligated to support the issuance in the secondary market.

A simple channel through which the underwriter can affect the pricing is to offer rebates to attract participants to the auction. Because underwriters do not need to disclose the rebates to the public, they can use rebates to price discriminate investors, potentially corrupting the transparency and quality of the issuance process. The regulator of China's interbank market, the National Association of Financial Market Institutional Investors (NAFMII), was so concerned about the widespread use of rebates that it issued a new regulation banning underwriters from using rebates after October 1, 2017. The average issuance overpricing dropped from 7.44 bps before the rebate ban to 2.41 bps after the rebate ban. This policy shock allows us to further examine the effects of rebates and the underwriter's incentives for issuance overpricing.

Because a stronger incentive for the underwriter to win the issuer's future business induced the underwriter to use rebates to generate a higher overpricing before the rebate ban, we hypothesize that issuances by underwriters with stronger incentives experienced greater drops in overpricing after the rebate ban. This hypothesis motivates a difference-in-differences analysis of how the drop in overpricing varies across different issuers and underwriters. Because central state-owned enterprises (SOEs) are usually giant firms that enjoy the central government's implicit guarantees, they are more valuable issuers than other firms and thus attract more intense competition for their issuances. Consistent with this notion, we find that after the rebate ban, the drop in overpricing was significantly greater for debt securities issued by central SOEs than for those by other issuers. Furthermore, because the "Big Four" banks (Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, and China Construction Bank) are the largest underwriters in the interbank mar-

by the Chinese government to manage its financial system, for example, Brunnermeier et al. (2020).

[3] China also has an exchange market for corporate debt securities. Because banks are restricted from trading in the exchange market, this market is substantially smaller than the interbank market.

[4] Given the total issuance size in our sample of about 21 trillion RMB and an average maturity of 1.74 years, this overpricing implies a savings of around 18 billion RMB for issuers in the five-year period covered by our sample. This magnitude is economically significant relative to the underwriting fee, which is about 30 bps.

ket, these top underwriters face less competition and thus have fewer incentives to use rebates to generate overpricing. We indeed find that the drop in overpricing after the rebate ban was significantly smaller for issuances underwritten by the Big Four banks. These significant difference-in-differences results support our hypothesis and highlight underwriters' incentives and their use of rebates as an important mechanism for generating issuance overpricing.

Interestingly, even after the rebate ban, issuance overpricing remained significant, albeit reduced, suggesting additional forces at work to sustain overpricing. As a key feature of China's interbank market, most licensed underwriters are banks, which regularly purchase corporate debt securities in the primary market for their own investment accounts.[5] Indeed, our data show that underwriters, on average, acquire 35% of the debt securities that they underwrite themselves either for their own accounts or clients. We find a surprising pattern that underwriters tend to acquire more in issuances with higher overpricing, suggesting underwriters take losses in their self-purchases. This pattern contradicts two alternative hypotheses. One posits that underwriters acquire the issued securities to take advantage of market undervaluation and thus earn superior returns from their self-purchases. The other argues that underwriters provide price support to the issuances at the fundamental values, which implies fair returns for their self-purchases. Instead, this finding points to overbidding by underwriters as another channel for generating issuance overpricing, which is particularly relevant after the rebate ban.[6]

Finally, we confirm that the rebate ban has helped improve the quality of the issuance price. By examining the ability of a set of publicly observed debt and issuer characteristics to explain the cross-sectional variation of the issuance price before and after the rebate ban, we find that the explanatory power of these fundamental variables increased after the rebate ban, indicating an improvement in the quality of the issuance price.

Overall, our study not only documents pervasive issuance overpricing in China's interbank market for corporate debt securities, but also attributes this surprising finding to China's distinct institutional environment and issuance process. Our study thus motivates future studies to systematically examine the implications of the distinct institutional arrangements in this market on other important aspects, such as asset pricing and market efficiency, and to compare China with Western countries on these aspects.

The related literature

Our study contributes to several strands of the finance literature. First, it expands the literature on the issuance pricing of corporate debt securities. Datta et al. (1997), Helwege and Kleiman (1998), Cai et al. (2007), Hale and Santos (2007), Goldstein and Hotchkiss (2009), and Bessembinder et al. (2020) show significant underpricing for IPOs and seasonal offerings of corporate bonds in the U.S., although their findings on investment-grade bonds are mixed.[7] Evidence of underpricing in the European markets also exists, for example, Wasserfallen and Wydler (1988) and Zaremba (2014). Different from other major markets of corporate debt securities around the world, Matsui (2006) and McKenzie and Takaoka (2008) provide preliminary evidence of issuance overpricing in Japan. Perhaps unsurprisingly, overpricing appears both in Japan and China because their markets share important similarities, including having banks as major investors and underwriters. Our analysis not only shows robust evidence of issuance overpricing in China, but also provides extensive analysis of the mechanisms that lead to the overpricing, which is missing from the studies of overpricing in Japan.

Second, our paper adds to the economic understanding of issuance pricing. The existing literature focuses mostly on two key mechanisms for security underpricing. One is information asymmetry, for example, Rock (1986), Benveniste and Spindt (1989), Benveniste et al. (2002), and Sherman and Titman (2002), and the other is liquidity, for example, Booth and Chua (1996) and Ellul and Pagano (2006). Complementing these studies,[8] our analysis provides extensive evidence for a different mechanism that generates issuance overpricing, specifically, underwriter competition. Datta et al. (1997) speculate that the overpricing they find in their study of bond IPOs in the U.S. market could be driven by excessive competition among underwriters, but they do not provide evidence on either underwriter incentives or the channels.

Third, our paper also complements the literature on how business relationships affect the book-building process. Several studies document that in the U.S. market, underwriters may misuse their discretion over both price and the allocation of new issuances. Instead of underpricing the issuances to reward information production, under-

[5] According to data released by Shanghai Clearing House (SHCH), a leading clearing house that offers clearing services for debt securities in the interbank market, banks hold over 50% of all nonfinancial debt securities in China either directly on balance sheet or indirectly off balance sheet.

[6] The Chinese banking regulations permit commercial banks to invest in debt securities that they underwrite themselves. Even though the regulations require each bank to establish a firewall system between the investment banking division and the financial market division, these two divisions can nevertheless coordinate with each other under certain compliance guidelines that aim to prevent banks from transferring too much underwriting risk to their own balance sheets. For more details, please refer to the No. 16 [2012] of the Chinese Banking Regulatory Commission (CBRC), April 12, 2012, "*Notice of the Chinese Banking Regulatory Commission on Strengthening the Risk Management of Debt Security Underwriting Business of Commercial Banks.*"

[7] For instance, Datta et al. (1997) find moderate overpricing in a sample of 18 IPOs of investment-grade bonds in the U.S. (Cai et al., 2007) study 2975 corporate bonds issued between 1995 and 1999 in the U.S. and find no significant mispricing on investment-grade bonds. Meanwhile, Goldstein and Hotchkiss (2009) examine 3181 corporate bonds issued between 2002 and 2006 in the U.S. and show a first-day excess return of 15 bps for the investment-grade bonds in their sample.

[8] Asymmetric information between issuers and investors is less of a concern in China's debt-security market, with banks serving as major investors and underwriters in the market. Their underwriting activities make them well-informed of market conditions and the risks of individual bond issuers. Furthermore, due to the short maturities of corporate debt securities, most issuers need to repeatedly issue debt securities, and as a result, an underwriter may continue to work for an issuer in a series of issuances. The low default rate in this market, possibly due to implicit government guarantees, further alleviates the adverse-selection problem.

writers may use underpricing as a quid pro quo for the investors' future businesses or kickbacks, with new issuances being allocated based on a continuing business relationship (e.g., Reuter, 2006; Nimalendran et al., 2007; Liu and Ritter, 2010; Goldstein et al., 2011). Our study shows that under China's institutional environment, future business relationships between the underwriter and the issuer lead to issuance overpricing rather than underpricing.

Finally, our paper also adds to the quickly growing literature on China's financial system. See the handbook edited by Amstad et al. (2020) for chapters on different segments of China's financial system and, in particular, the chapter by Amstad and He (2020) for an overview of China's interbank market for corporate debt securities. Ang et al. (2017) examine the pricing of municipal bonds in China and link the pricing to real estate and political risks. Chen et al. (2020) argue that the rapid growth of China's municipal bond market is driven by the need of local governments' financing platforms to roll over bank loans initially given during China's 4 trillion RMB post-crisis stimulus package. Chang and Liu (2021) propose a theory to explain the regulator' incentive for developing bond market and, more broadly, allowing the growth of shadow-banking system, which is to contain the overinvestment caused by local government. By exploring the different rules used by the interbank market and the exchange market for repo transactions, Chen et al. (2019) find that an increase in the haircut requirement can have a substantial effect on firms' debt-financing costs in China. Liu et al. (2017), Geng and Pan (2020), and Chang et al. (2021) discuss the impact of implicit guarantee on bond pricing. Our paper shares the common theme of these papers in exploring important characteristics of China's corporate debt-security market, but with a distinct focus on issuance pricing.

The remainder of the article is organized as follows. Section 2 introduces the institutional background of China's interbank market. Section 3 summarizes our data and measurement methodology. Section 4 documents issuance overpricing, and Section 5 examines the economic mechanisms. We conclude the paper in Section 6. We also provide an Internet Appendix, which is available at the journal website, to report additional results.

2. Institutional background

In this section, we provide a brief overview of key features of China's market for corporate debt securities and describe the issuance process in this market.

2.1. An overview of the market

China has both exchange and interbank markets for corporate debt securities. The interbank market is an over-the-counter market. In contrast, the exchange market is a centralized market in which individuals and small and medium-sized institutions trade debt securities through centralized trading platforms.

As a legacy of China's credit plan, banks had been closely following the benchmark lending rates announced by the People's Bank of China (PBC) to determine rates for bank loans rather than basing interest rates on market conditions and borrowers' credit quality. To reform this key sector of China's financial system, the Chinese government adopted its usual strategy of dual-track reform by introducing a market track in 1997. Specifically, the government introduced an interbank market, which allows firms to issue debt securities to banks, to compete with the existing state track, that is, the bank loan market.[9] Consequently, a firm can now choose to obtain a loan directly from a bank or issue a debt security in the interbank market. This competition is intended to make the bank loan market, which continues to be the primary channel of firm financing, more market driven. Different from typical corporate debt-security markets outside China, investors in China's interbank market are primarily banks, because banks, as the financial institutions that existed prior to China's economic reforms, hold most of the national savings, including those of households, firms, and local governments. Soon after its creation, the interbank market became the dominant market for issuance and trading of corporate debt securities in China.

As shown by Fig. A1 in the Internet Appendix, the interbank market accounted for nearly 100% of new debt-security issuances in 2010. Its market share remained above 88%, even at its lowest point in 2016. Given the dominance of the interbank market, this paper focuses on the issuance of corporate debt securities in the interbank market.[10] Only qualified institutions, including commercial banks, mutual funds, insurance companies, and security firms, can participate in the interbank market. In December 2018, the total number of interbank market members reached 6,543. The PBC oversees the interbank market through NAFMII, which is responsible for formulating rules to govern institutional participants in the interbank market.

China's interbank market has three major categories of fixed-income securities based on issuing entities: government debt securities, financial debt securities, and nonfinancial corporate debt securities. In this paper, we focus on debt-financing instruments of non-financial enterprises, which are issued by nonfinancial firms and administered by NAFMII.[11] Fig. 1 shows the issuance size of different types of debt-financing instruments of non-financial enterprises for each year for 2009–2019. The total annual issuance size has grown substantially, from around 1 trillion RMB in 2009 to 6.6 trillion RMB in 2019. There is a lack of long-term corporate bonds. Instead, commercial paper and medium-term notes account for more than 86% of all issuances; the rest are asset-backed notes and private place-

[9] See Song and Xiong (2018) for a discussion of China's dual-track reforms and Ma and He (2020) for a review of China's interest rate liberalization.

[10] In the exchange market for corporate debt securities, the waiting period between issuance and secondary market trading is long. This period varies from one week to three months and is, on average, about 45 days in our sample period. Due to the potential price fluctuation during this long waiting period, it is difficult to precisely measure issuance overpricing. This difficulty motivates us to exclude issuances in the exchange market from our analysis.

[11] Financial debt securities are mainly issued by large banks that have implicit government guarantees. Because major investors and underwriters in the primary market are also the same group of banks, financial debt securities have very different characteristics compared to nonfinancial debt securities.

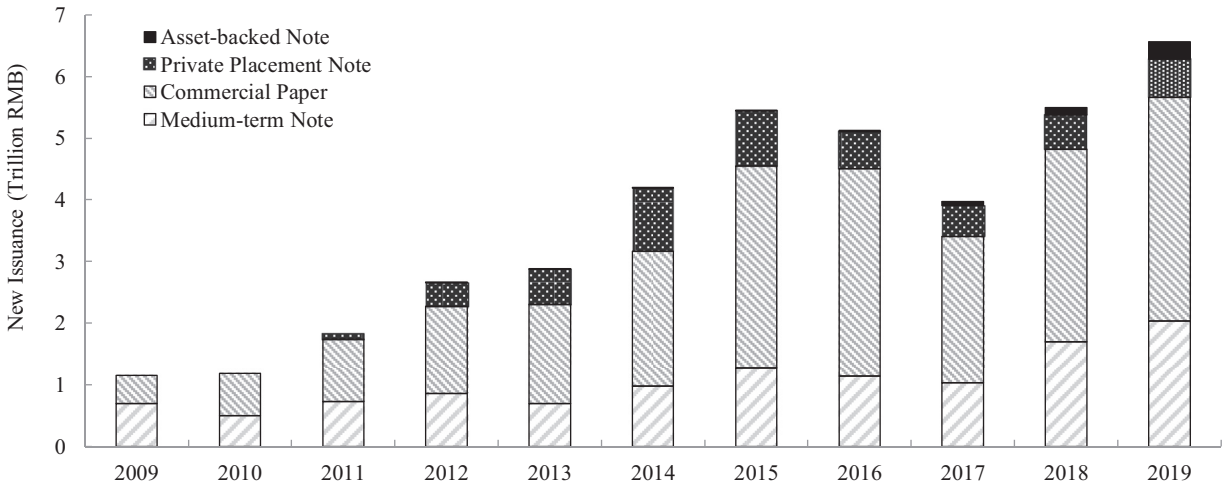

Fig. 1. Issuance of debt instruments by category. This figure plots the issuance amount of debt-financing instruments of non-financial enterprises in the interbank market by category from 2009 to 2019.

ment notes. Our sample comprises commercial paper and medium-term notes.

2.2. Issuance of corporate debt securities

To issue a debt instrument in the interbank market, an issuer must register the instrument with NAFMII following its *Rules on the Registration for Issuance of Non-Financial Enterprises Debt Financing Instruments in the Interbank Bond Market*. The issuance takes the form of a standard single-price auction. The issuer usually hires one, or sometimes two, underwriters. NAFMII has issued underwriter licenses to 68 institutions, which are listed in Table A1 of the Internet Appendix. The initial 24 institutions obtained their licenses before 2010 and included all the large banks in China, specifically, the five state banks (Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, and Bank of Communications), the two development banks (China Development Bank and the Import-Export Bank of China), and all the joint-stock commercial banks (such as China Merchant Bank and Ping An Bank). Only two nonbank institutions were on the initial list of underwriters, CITIC Securities and China International Capital Corporation. This list was gradually expanded to include smaller banks and more securities firms, as well as subsidiaries of four non-Chinese banks, specifically, HSBC Bank (China), Standard Chartered Bank (China), BNP Paribas (China), and Deutsche Bank (China). NAFMII has also authorized 77 other financial institutions to participate in issuance auctions.

Although the market regulator NAFMII and market participants often use the term "book building" to refer to the underwriting process in China's interbank market, the issues are sold through an issuance auction without giving the underwriter much discretion to allocate the issues.[12] Instead, the underwriter is responsible for not only attracting investors to the issuance auction, but also for participating in the auction to bid in the issuance auctions for its own investment account or for its clients who are not qualified to directly participate in the auction. Other qualified institutions may also bid for their own accounts or other unqualified investors.

Prior to the issuance auction, the issuer and the underwriter sign a letter to confirm the price range for the issuance. The underwriter then contacts potential investors to participate in the auction. One day before the auction, the underwriter sends a formal subscription statement to participating institutions and publishes the statement to the public. The subscription statement includes major terms of the issuance, the interest rate range of the issuance, the subscription timeline and procedure, placement and payment terms, and the designated payment account.

On the issuance day, a single-price auction is held in which all participating institutions submit sealed bids of rate-quantity pairs that specify the amount to be purchased at a specified minimum yield to the underwriter. The clearing price is identified by equating the aggregate demand submitted by all bidders to the total issuance amount. All winning bidders pay the same price. The issuer could cancel or delay the issuance if the quantity submitted by bidders is not sufficient to clear the issuance amount or if the clearing price is not acceptable to the issuer. If the issuance succeeds, it is settled on the following day. Secondary market trading starts on the first business day after the settlement is complete. The auction yield is disclosed to the market before the first day of secondary market trading.

This issuance process in China is sharply different from that in the U.S. in terms of pricing and allocation. In the

[12] IPOs in China's equity market also use a similar auction process rather than the typical book-building process that gives the underwriter discretion to allocate shares, as discussed by Qian et al. (2020). However, because the equity IPOs face restrictive pricing regulations that cap IPO prices at certain multiples of firm earnings, equity IPOs in China tend to have substantial underpricing.

U.S. market, the offering price is set by issuers and underwriters. To induce investors to reveal their demand, underwriters usually set the offer price below the level that is expected to prevail in secondary market trading. Underwriters also regularly overallocate the issues (i.e., allocate a quantity at the issuance price that exceeds the intended issuance size), especially when they expect a weak secondary market demand (Bessembinder et al., 2020). Such overallocation places the underwriters in a net short position, allowing for subsequent stabilizing purchases in the secondary market. In China's interbank market, both issuance price and allocation are determined by the auction, and overallocation is not allowed. Because most underwriters are banks, they regularly bid in the auction for their own accounts, not just for clients. Meanwhile, underwriters are not obligated to stabilize the issuances in the secondary market.

3. Data and overpricing measures

3.1. Data sample

Our data sample includes all commercial paper (CP) and medium-term notes (MTN) issued by nonfinancial firms in China's interbank market from 2015 to 2019.[13] Debt characteristics and issuer information, including issuance size, issuance date, maturity date, debt rating, the issuer's credit rating, and the issuer's location, are from WIND, a data vendor, and the China Foreign Exchange Trade System (CFETS). Transaction prices for security trading in the secondary market are obtained from WIND and Choice, another major data vendor. Information from various data sets is cross-checked and verified. Taken together, our initial sample covers 19,510 debt securities with a total issuance size of over 23 trillion RMB.

To complement the above data, we also collect detailed issuance-auction data of 17,373 debt securities issued between 2015 and 2019 from NAFMII.[14] These data, reported for NAFMII's monitoring purposes, are confidential. The data set contains the complete allocation of the issues to each winning bidder, including the quantity acquired by the underwriter in each issuance for its own account and clients. Bank underwriters are in many cases both intermediaries and investors.

3.2. Overpricing measures

Following the literature, for example, Lou et al. (2013), we use two measures of issuance overpricing in this paper. The first is the annualized spread change from issuance to the first trading day, that is, the first day that a trade occurs in the secondary market.[15] The spread is defined as the difference in yield between a given debt security and the risk-free rate of similar maturity.[16] A debt security's issuance spread change is then calculated as the spread difference between the first trading day and the issuance as follows:

$$\Delta\text{Spread} = \text{Spread}_{\textit{first trade}} - \text{Spread}_{\textit{issuance}}. \quad (1)$$

Because yield is negatively related to price, a positive spread change implies that the debt security is overpriced at issuance relative to the trading price in the secondary market.

Similar to the U.S. corporate bond market, the first secondary-market transaction may not occur on its first trading day, due to illiquidity of the secondary market. To alleviate the concern about noise being induced by the potentially long delay in the first secondary-market trade, we follow Cai et al. (2007) to require that our sample only includes debt securities that have at least one trade within seven calendar days from the first trading day, that is, within five trading days if there is no holiday during the week. This requirement only modestly reduces our sample from 19,510 to 18,229 debt securities issued by 2,558 firms, among which 17,709 are traded on their first trading day.

We also use a second measure of issuance overpricing, the security's excess return from its issuance to the first trading day. We first calculate its raw return as

$$\text{Ret}_i = (\text{P}_{i,T} - \text{P}_{i,t})/\text{P}_{i,t}, \quad (2)$$

where Ret_i is the raw return of security i that is issued on day t and then first traded on day T. The price $\text{P}_{i,T}$ is the sum of the flat price and accrued interest, and $\text{P}_{i,t}$ is the issuance price. We then adjust the raw return by benchmarking it to the corresponding benchmark return of the CSI Corporate Debt Security Index with the same credit rating.

These two measures are closely related to each other because debt-price appreciation is equal, by first-order approximation, to the negative yield change multiplied by duration. Nevertheless, these two measures offer different interpretations. Because yield serves as an indicator of the issuer's cost of debt financing, the yield spread change from issuance to the first secondary-market trade measures overpricing through the reduction in the issuer's cost of debt financing per year. The negative value of the excess return from issuance to the first trade reflects the net loss to investors who acquire the security at issuance.[17] These two measures provide similar results in our analysis.

[13] Note from Fig. A1 in the Internet Appendix that the volume of issuance was relatively low before 2015. Our sample ends in 2019 because the Chinese financial markets were substantially disrupted in early 2020 due to the COVID-19 pandemic. As shown in Fig. 1, CP and MTN account for about 86% of all nonfinancial corporate debt securities issued in the interbank market. The rest include either private placement notes (PPN) or asset-backed notes (ABN). We exclude PPN and ABN from our analysis because PPN is not issued through the auction process and ABN is fundamentally different from CP and MTN.

[14] The data from NAFMII contain issuance-auction information for almost all CP and MTNs issued from 2016 to 2019 and about 60% of the CP and MTN issued in 2015.

[15] Because the first trade might take place a few days later, the first trading day is not necessarily the first day after issuance that the secondary market is open.

[16] The Chinese Treasury yield indices are used as the risk-free rate. We use spread change instead of yield change to measure overpricing to alleviate the concern that overpricing could be driven by the risk-free rate change. In fact, the magnitude of the risk-free rate drift is marginal, because over 97% of the debt securities were traded on their first trading day, which is one day after the auction is settled. All our results hold if we use yield change.

[17] Due to the limited availability of market indices in China, neither of these measures is perfect. Ideally, we would like to benchmark each debt

Table 1
Summary statistics of debt-security issuance. This table reports summary statistics of the issuance of non-financial corporate debt securities in the interbank market from 2015 to 2019. Panel A reports the number of issuances, issuing companies, and the total issuance amount for each year. Panels B and C report the summary statistics of security and issuer characteristics, respectively. Trading Volume is for the month right after issuance. The subscription ratio is calculated by dividing the total subscription by the issuance amount. The dummy variable First Issue Dummy equals 1, if the security is the issuer's first issuance in the interbank market, and 0 otherwise. Recent Issuance Dummy is another dummy variable and equals 1 if the issuer has issued security in the previous year, and 0 otherwise. We convert letter credit ratings into numerical values, specifically, AAA to 5, AA+ to 4, AA to 3, AA− to 2, and *A*+ to 1. ROA is defined as net income divided by total assets. Sale is the issuer's annual sales. Panel D summarizes the share of issuances directly acquired by underwriters. The number of observations, the mean, the standard deviation, the 25th percentile, the median, and the 75th percentile are reported in Panels B–D.

Panel A: Issuances across years

	2015	2016	2017	2018	2019	Total
No. of Issues	3,379	3,441	2,880	4,087	4,442	18,229
issued by the Big Four banks	1,258	1,400	957	1,353	1,431	6,399
No. of Companies	1,304	1,238	1,016	1,195	1,354	2,558
Issue Amount (¥bil)	4,457	4,302	3,197	4,488	4,626	21,069

Panel B: Debt-security characteristics

	N	Mean	SD	P25	P50	P75
Coupon rate (%)	18,229	4.54	1.23	3.55	4.44	5.34
Maturity (year)	18,229	1.74	1.71	0.74	0.76	3.01
Issue Amount (¥mil)	18,229	1,156	1,205	500	1,000	1,500
Trading Volume (¥mil)	18,229	1,350	1,730	440	840	1,609
Subscription Ratio	17,416	1.74	0.88	1.10	1.49	2.08
First Issue Dummy	18,229	0.07	0.26	0.00	0.00	0.00
Recent Issuance Dummy	18,229	0.84	0.36	1.00	1.00	1.00
Rating	18,229	4.18	0.83	4.00	4.00	5.00

Panel C: Issuer characteristics

	N	Mean	SD	P25	P50	P75
Leverage	18,222	0.65	0.13	0.57	0.66	0.74
ROA	18,219	0.02	0.02	0.01	0.02	0.03
Asset (¥mil)	18,222	163,611	434,672	25,090	55,627	153,839
Sale (¥mil)	18,148	59,335	163,015	4,269	15,051	54,261
Cash (¥mil)	18,148	13,781	38,005	2,266	5,491	14,391

Panel D: Issuances purchase by underwriters

	N	Mean	SD	P25	P50	P75
Underwriter Share	16,384	0.35	0.31	0.07	0.29	0.56

3.3. Summary statistics

Table 1 provides summary statistics of issuances in our sample. Panel A shows that the issuance of debt securities had grown to 4.6 trillion RMB (about 0.66 trillion USD at an exchange rate of 7 RMB/USD) in 2019. Among all the debt securities issued in our sample, more than 35% are underwritten by one of the Big Four state banks.[18] Panel B reports characteristics of the securities in our sample. They have an average maturity of 1.74 years with an average issuance size of 1.16 billion RMB. Different from the U.S. bond market, debt securities issued in China's interbank market tend to have much shorter maturities. The mean (median) *Subscription Ratio*, the ratio between the total subscription and the issue amount, is 1.74 (1.49), suggesting that most securities in our sample are oversubscribed. The mean of *Trading Volume*, which is for the month after issuance, is 1,350 million RMB.

We define the variable *First Issue Dummy* as equal to 1 if it is the first time the issuer has ever issued a debt security in the interbank market, and 0 otherwise. From the statistics of the *First Issue Dummy*, about 7% of the issuances in our sample are first-time issuances. Similarly, we also define the dummy variable *Recent Issuance dummy*, which equals 1 if the issuer has issued debt securities in the previous year, and 0 otherwise. About 84% of the issuances are by firms that have issued securities in the previous year. All the debt securities are rated as one of the following five categories: AAA, AA+, AA, AA-, and *A*+. We convert letter ratings into numerical values, specifically, AAA to 5, AA+ to 4, AA to 3, AA- to 2, and *A*+ to 1. The

security to a market index with the same maturity and the same credit rating so that the index controls for both term and credit premia. However, we are not able to match each debt security in our sample with such a precisely matched index. Instead, we use a Treasury yield index with a similar maturity to compute the yield spread change, and a corporate debt index with the same credit rating (albeit not necessarily the same maturity) to calculate the excess return. Because more than 97% of debt securities in our sample are traded on the first trading day, the index yield or return only changes marginally and, therefore, would not significantly affect our overpricing results. We have also used other benchmark indices and found similar results.

[18] When a debt security has more than one underwriter, we define the security as being underwritten by a Big Four bank if at least one of the underwriters is a Big Four bank.

median rating is 4 (i.e., AA+).[19] Panel C reports characteristics of issuers in our sample. Generally, the issuers are large firms with mean (median) total assets of 164 (56) billion RMB and mean annual sales of 59 billion RMB. They have an average leverage ratio of 0.65 and an average ROA of 2%.

Panel D summarizes the share of issues directly acquired by their underwriters. Each issuance usually has one or two underwriters. We construct a variable called *Underwriter Share* by aggregating the shares purchased by all underwriters in each issuance. An underwriter may purchase the security either for its own account or on behalf of its clients. In our sample, underwriters, on average, purchased 35% of the issues. This large share makes underwriters' direct bidding a potentially important channel for issuance overpricing, which we examine in Section 5.4.

4. Issuance overpricing

We use the spread change, ΔSpread, as the primary measure of issuance overpricing. In Table 2, Panel A, we present summary statistics of ΔSpread, which has an average of 4.9 bps and is statistically significant. This positive spread change indicates that the debt securities in our sample tend to be overpriced at issuance relative to their secondary-market trading prices.

We also examine the spread change in a longer period after issuance to determine whether any price reversal occurs after the first secondary market trade. We calculate the $\Delta\text{Spread}_{15\ days}$, which is the difference between the yield spread of a new debt security on the 15th calendar day after issuance and its issuance spread. If the security is not traded on the 15th calendar day, we use the spread of the closest trading day within a five-day window centered on the 15th calendar day. The mean of $\Delta\text{Spread}_{15\ days}$ is 7.93 bps and is statistically significant. We further calculate the difference between $\Delta\text{Spread}_{15\ days}$ and ΔSpread for each security, which requires the existence of both $\Delta\text{Spread}_{15\ days}$ and ΔSpread. The mean difference between $\Delta\text{Spread}_{15\ days}$ and ΔSpread is 1.96 bps, which is statistically significant and indicates a further downward drift in the price after the first trade. The lack of any reversal of the downward price drift after the first trade shows that issuance overpricing measured by the spread change of the first trading day is robust.

On September 1, 2017, the market regulator, NAFMII, issued a new regulation to prohibit underwriters from using rebates in issuance. This ban on underwriter rebates provides a natural experiment, which is exogenous to any particular issuance, yet has cross-sectional implications for issuance outcomes. Because we use this policy shock to examine the relationship between rebates and overpricing, we also summarize the spread change for issuances before and after the rebate ban. As shown, the average overpricing drops from 7.44 bps to 2.41 bps after the rebate ban, even though the overpricing remains highly significant. This sharp drop in issuance overpricing after the rebate ban indicates the relevance of underwriter rebates in driving issuance overpricing.

In Panel B of Table 2, we use the excess return as a measure of issuance overpricing. The average first-trading-day excess return reaches −7.67 bps and is statistically significant. Meanwhile, the excess return over the 15 calendar days after issuance is −12.46 bps, indicating an even bigger magnitude of overpricing than the one-day excess return. These negative excess returns are consistent with the positive spread changes shown in Panel A, and thus confirm overpricing at issuance.[20]

Next, we examine how the issuance overpricing varies across issuances and across issuers with different characteristics. We report mean spread changes in Table 3. In Panel A, we group the issuances in our sample based on credit ratings. Overpricing is present in all rating groups, with the AAA group having the highest overpricing of 6.53 bps and the AA+ group having the lowest overpricing of 3.23 bps, which is nevertheless highly significant.

In Panel B, we group issuances according to debt maturities within each rating group. The summary statistics show that all maturity groups exhibit overpricing. For instance, among AAA securities, those with maturities less than one year have an average overpricing of 9.18 bps, while those with maturities longer than two years have an average overpricing of 1.65 bps. Both are statistically significant.[21] In Panel C, we split each rating group into two equal subgroups based on the issuer's total assets. Overpricing is present in each subgroup with similar magnitudes.

In Panel D, we examine how overpricing varies across issuing history. If a firm has not previously issued any debt security in the interbank market, we denote the firm's issuance as a first-time issuance. Both first-time and seasoned issuances display significant overpricing, with an average of 2.82 bps and 5.06 bps, respectively.

In Panel E, we partition issuances into two groups by whether the issuer is an SOE directly controlled by the central government (hereafter, central SOE).[22] There are over 100 central SOEs, such as PetroChina, China Telecom, China National Cereals, and Oils and Foodstuffs Corporation, which tend to be the largest and most important firms in China and have implicit guarantees from the central government.[23] Given the economic strength and

[19] See Livingston et al. (2018) and Amstad and He (2020) for a detailed discussion of heavy concentration of Chinese corporate debt securities in these highly rated categories.

[20] Goldstein and Hotchkiss (2009) show a first-day excess return of 15 bps for investment-grade bonds issued in the U.S. between 1995 and 1999. The issuance overpricing in China's interbank market (a first-day excess return of −10.3 bps before the rebate ban and −5.08 bps after the rebate ban) is in the same order of magnitude, despite the opposite sign, as the mispricing in the U.S. corporate bond market. Because corporate debt securities issued in China have much shorter maturities, the maturity-adjusted mispricing in China might have an even bigger magnitude.

[21] Table A2 of the Internet Appendix partitions the sample into CP and MTNs. CP has an average first trading day spread change of 6.44 bps, while MTNs have a spread of 1.46 bps, both significant at the 1% level.

[22] The State-Owned Assets Supervision and Administration Commission, a special commission of the State Council, oversees central SOEs.

[23] In 2017, central SOEs had combined assets of 168.6 trillion RMB (24.4 trillion USD) and revenue of more than 23.4 trillion RMB (3.6 trillion USD), according to Xinhuanet's March 9, 2017, article "China's central SOEs deliver strong performance."

Table 2
Issuance overpricing. This table reports the summary statistics of the spread change and the excess return after issuance. Panel A reports the summary statistics of ΔSpread, which is the spread difference between the issuance and the first trading day after issuance, $\Delta Spread_{15\ days}$, which is the spread difference between the issuance and the 15th calendar day since issuance, and the difference between ΔSpread and $\Delta Spread_{15\ days}$. The spread is calculated as the corporate debt yield minus the corresponding Chinese Treasury Yield Index of similar maturity. Panel B reports the summary statistics of the first-trade excess return, the excess return over 15 calendar days after the issuance, and the difference between the $Excess\ return_{15\ days}$ and the Excess return. If the security is not traded on the 15th calendar day, we use the spread or return of the closest trading day within a five-day window centered on the 15th calendar day. We can only calculate the $\Delta Spread_{15}$ and $Excess\ return_{15\ days}$ for 5,464 issuances due to infrequent trading. The number of observations, the mean, the standard deviation, the *t*-statistic clustered by issuance date, the skewness, the kurtosis, the 5th percentile, the 25th percentile, the median, the 75th percentile, and the 95th percentile are reported. Both spread change and excess return are in basis points (bps). Our sample is from 2015 to 2019, and the rebate ban became effective on October 1, 2017.

Panel A: Spread change (bps)											
Full sample	N	Mean	SD	*t*-Stat.	Skew.	Kurt.	P5	P25	P50	P75	P95
ΔSpread	18,229	4.90	12.30	26.46	3.85	37.97	−6.87	−0.82	2.55	8.08	23.35
$\Delta Spread_{15\ days}$	5,464	7.93	39.41	12.18	9.17	268.99	−35.00	−7.25	4.71	17.94	58.44
$\Delta Spread_{15\ days}$ -ΔSpread	5,464	1.96	38.15	3.22	9.97	308.23	−39.62	−11.23	−0.17	11.60	46.50
Before rebate ban											
ΔSpread	9,026	7.44	11.00	36.74	2.74	42.86	−4.82	1.96	6.57	10.70	26.28
$\Delta Spread_{15\ days}$	2,984	10.53	38.03	11.57	1.66	14.57	−34.81	−5.63	7.37	21.34	66.56
$\Delta Spread_{15\ days}$ -ΔSpread	2,984	2.69	37.62	3.07	1.56	14.82	−45.48	−12.26	−0.50	12.95	55.99
After rebate ban											
ΔSpread	9,203	2.41	12.97	9.41	5.02	41.16	−7.68	−2.10	0.36	3.23	15.99
$\Delta Spread_{15\ days}$	2,480	4.81	40.79	5.45	16.63	507.77	−35.28	−8.54	2.17	13.69	50.12
$\Delta Spread_{15\ days}$ -ΔSpread	2,480	1.07	38.77	1.30	19.23	622.97	−35.26	−9.92	0.18	10.11	36.73
Panel B: Excess return (bps)											
Full sample	N	Mean	SD	*t*-Stat.	Skew.	Kurt.	P5	P25	P50	P75	P95
Excess return	18,229	−7.67	10.50	−42.72	−2.52	62.38	−22.43	−11.60	−6.20	−2.46	3.52
$Excess\ return_{15\ days}$	5,464	−12.46	44.38	−13.93	−0.84	27.29	−74.60	−29.40	−12.00	6.37	47.31
$Excess\ return_{15\ days}$ - Excess return	5,464	−4.08	42.60	−5.15	−0.86	33.29	−60.21	−19.48	−3.39	11.88	52.80
Before rebate ban											
Excess return	9,026	−10.30	11.14	−40.87	−2.40	54.20	−25.44	−14.90	−9.65	−4.91	3.04
$Excess\ return_{15\ days}$	2,984	−16.92	45.85	−13.11	−0.05	12.61	−85.44	−35.63	−16.09	4.69	43.16
$Excess\ return_{15\ days}$ - Excess return	2,984	−6.39	44.11	−5.61	0.13	15.54	−69.75	−22.77	−4.71	12.77	49.34
After rebate ban											
Excess return	9,203	−5.08	9.12	−26.79	−2.92	95.86	−16.48	−7.14	−4.00	−1.44	3.83
$Excess\ return_{15\ days}$	2,480	−7.11	41.93	−6.30	−2.06	54.60	−57.02	−23.39	−8.78	7.87	52.08
$Excess\ return_{15\ days}$ - Excess return	2,480	−1.30	40.55	−1.24	−2.37	63.86	−48.49	−15.71	−2.02	10.69	56.41

credit quality of these firms, they are often regarded as underwriters' most valued clients. Interestingly, issuances by central SOEs are associated with higher overpricing. For instance, they have an average overpricing of 10.31 bps, substantially higher than the overpricing of 4.37 bps of issuances by other firms. This large difference is consistent with an argument that underwriters compete hard for issuances of central SOEs, which we further explore in our subsequent analysis.

In Panel F, we partition issuances into groups by whether the underwriter is a Big Four bank. These banks are the largest underwriters in the interbank market and have underwritten more than 35% of the issuances in our sample. This panel does not show any significant difference in overpricing between the issuances underwritten by the Big Four banks and other underwriters. Our later analysis shows that after controlling for debt rating, the overpricing of issuances underwritten by the Big Four banks is less than those by other underwriters because the Big Four banks are more likely to underwrite issuances with an AAA rating, which tend to have greater overpricing.

Table 3 also shows how overpricing across these subsamples changes around the rebate ban. Interestingly, after the rebate ban, overpricing is present primarily in issuances with an AAA rating. After the rebate ban, underwriters could boost the issuance price only by directly bidding for their own accounts or for their clients. Consequently, risk considerations could have prevented them from overbidding in issuances with substantial credit risks. We further examine this underwriter bidding channel of issuance overpricing in Section 5.4.

In sum, Table 3 shows significant issuance overpricing of corporate debt securities that is robust across time, issuances, and issuers with different characteristics. In Table A3 of the Internet Appendix, we also report summary statistics of issuance overpricing by using the excess return on the first secondary-market trading day as the overpricing measure. The cross-sectional patterns are fully consistent with those in Table 3.

To gauge the relevance of the issuance overpricing, we also estimate trading costs in the secondary market. We apply the measure used by Corwin and Schultz (2012),

Table 3
Overpricing across security and issuer characteristics. This table reports the first trading day spread change in basis points (bps), ΔSpread, across different debt ratings, maturities, issuers' total asset, and issuing history, as well as issuer and underwriter types in the periods before and after the rebate ban. The number of observations, the mean, and the *t*-statistics clustered by issuance date are presented. The sample is from 2015 to 2019, and the rebate ban became effective on October 1, 2017.

		Full sample			Before rebate ban			After rebate ban		
Panel A: Sort by rating (bps)		N	Mean	*t*-Stat.	N	Mean	*t*-Stat.	N	Mean	*t*-Stat.
AAA		8,038	6.53	25.19	3,433	9.33	33.12	4,605	4.44	12.02
AA+		5,706	3.23	15.98	2,665	6.38	26.82	3,041	0.47	1.90
AA		4,275	4.03	19.23	2,724	6.22	25.09	1,551	0.19	0.78
AA- and *A*+		210	5.84	7.87	204	5.88	7.72	6	4.41	2.22
Panel B: Sort by rating and maturity (bps)		N	Mean	*t*-Stat.	N	Mean	*t*-Stat.	N	Mean	*t*-Stat.
	Maturity									
AAA	<1 year	4,905	9.18	24.82	2,248	11.99	32.88	2,657	6.80	11.75
	1–2 year	734	4.76	10.87	394	7.71	12.49	340	1.34	2.55
	≥2 year	2,399	1.65	8.24	791	2.57	7.34	1,608	1.20	4.96
AA+	<1 year	3,001	4.06	16.07	1,306	8.73	30.20	1,695	0.47	1.69
	1–2 year	1,005	4.23	10.13	621	6.63	14.68	384	0.34	0.48
	≥2 year	1,700	1.17	5.09	738	2.00	6.10	962	0.53	1.71
AA, AA-, and *A*+	<1 year	1,658	5.04	16.23	979	8.45	22.49	679	0.12	0.38
	1–2 year	1,289	6.06	16.20	1,074	7.21	17.44	215	0.34	0.56
	≥2 year	1,538	1.49	7.85	875	2.44	9.13	663	0.25	1.02
Panel C: Sort by rating and total assets (bps)		N	Mean	*t*-Stat.	N	Mean	*t*-Stat.	N	Mean	*t*-Stat.
	Total Assets									
AAA	Larger	4,026	7.69	22.17	1,718	10.17	26.35	2,314	5.92	11.68
	Smaller	4,012	5.36	19.18	1,715	8.48	24.63	2,291	2.94	7.86
AA+	Larger	2,853	3.25	13.35	1,338	6.59	21.43	1,521	0.73	2.43
	Smaller	2,853	3.21	14.28	1,327	6.16	21.67	1,520	0.21	0.79
AA, AA-, and *A*+	Larger	2,244	3.86	16.01	1,465	6.38	21.39	779	0.11	0.40
	Smaller	2,241	4.37	17.68	1,463	6.02	19.70	778	0.31	1.10
Panel D: Sort by issuance history (bps)		N	Mean	*t*-Stat.	N	Mean	*t*-Stat.	N	Mean	*t*-Stat.
First-time issuance		1,305	2.82	11.53	762	4.40	13.63	543	0.61	1.94
Seasoned offering		16,924	5.06	26.45	8,264	7.72	36.75	8,660	2.52	9.60
Panel E: Sort by issuer type (bps)		N	Mean	*t*-Stat.	N	Mean	*t*-Stat.	N	Mean	*t*-Stat.
Central SOE		1,635	10.31	20.15	923	12.24	22.99	712	7.81	8.39
Other		16,594	4.37	23.92	8,103	6.89	34.11	8,491	1.96	7.85
Panel F: Sort by underwriter type (bps)		N	Mean	*t*-Stat.	N	Mean	*t*-Stat.	N	Mean	*t*-Stat.
Big Four banks		6,399	4.71	22.20	3,415	7.53	30.87	2,984	1.49	5.38
Other		11,830	5.00	24.28	5,611	7.39	31.70	6,219	2.86	9.67

which is widely used in the literature. Because liquidity in the markets for corporate debt securities tends to decline over time after issuance, we estimate the trading cost during the first month after issuance. The estimated trading cost is 10.11 bps. This trading cost is in the same order of magnitude as our estimate of issuance overpricing (7.67 bps in the excess return measure), albeit somewhat larger. This large trading cost in the secondary market prevents investors from avoiding bidding in the primary market even if they are aware of the issuance overpricing.

5. Economic mechanisms

The pervasive issuance overpricing reflects the distinct institutional environment and issuance process in China's interbank market. In this section, we first describe a conceptual framework to discuss the perspectives of different institutions involved in an issuance and then provide empirical evidence to support several elements and mechanisms related to the overpricing.

5.1. A conceptual framework

The observed issuance overpricing concerns several institutions: the issuer, the underwriter, the investors, and the regulator. We organize our conceptual framework around the perspectives of each of these institutions.

5.1.1. Issuer

Consider an issuer that has selected an underwriter to issue a debt security. The issuer faces two types of direct costs: (1) the underwriting fee paid to the underwriter and (2) the interest cost paid to investors. Market regulator NAFMII discourages underwriters from reducing the underwriting fee.[24] With the inflexible underwriting fee,

[24] The underwriting fee is about 30 bps. According to its *Rules Governing the Intermediation Services for Debt Financing Instruments of Non-Financial Enterprises in the Interbank Bond Market*, NAFMII is averse to excessive competition among underwriters to bid down underwriting fees. On May 15, 2020, NAFMII punished two underwriters for reducing underwriting fees in a MTN issuance.

the issuer would naturally prefer a higher issuance price, which reduces the interest cost of the current issuance. Furthermore, overpricing also benefits the issuer through the benchmark effects of the issuance price. Different from equity markets, the secondary markets for corporate debt securities across the world tend to be illiquid, with infrequent trading and large trading costs. The same is true in China. As we discussed in the previous section, the trading cost in the secondary market is even greater than the magnitude of issuance overpricing in our sample. This illiquidity makes the secondary market prices less reliable and more manipulable. Furthermore, due to the short maturities in China's debt-security market, most firms need to repeatedly issue debt securities, making the issuance yield regularly available to the public. As a result, industrial reports in China commonly reference the issuance yield, rather than the yield from secondary market trading, as a key indicator of a firm's debt-financing cost. In particular, the issuance yield provides a publicly observed benchmark rate for the firm's future bank loan financing (by far the most important financing channel for firms in China).

5.1.2. Underwriter

An issuer usually issues debt securities repeatedly, and the underwriter faces competition from other underwriters for the issuer's future issuances. If an issuance does not meet the issuer's expectations, the issuer could replace its current underwriter with another one for its future issuances. As we discussed in Section 2.2, underwriters in China's interbank market are not obligated to stabilize the issuances in the secondary market, partly because the issuers are not particularly concerned with the secondary market prices. Instead, the competitive pressure incentivizes the underwriter to boost the price of the current issuance. We empirically examine this incentive in our subsequent analysis.

The underwriter can boost the issuance price through two possible channels. One is to offer personalized rebates to some participants of the issuance auction with reservation values right below the intended issuance price. Because the underwriter does not have to disclose the rebates to the public, it can reduce the rebate cost by discriminating the auction participants and offering the rebates only to a set of the participants. Alternatively, the underwriter may also directly boost the issuance price by bidding more aggressively for its own investment account. Because many of the licensed underwriters are banks, they regularly purchase debt securities in the primary market for their own investment.[25] Using direct bidding to boost the issuance price requires the underwriter not only to overpay for the issuance, which is equivalent to paying rebates, but also to bear the security's investment risk. Thus, rebates are the underwriter's preferred channel. We separately examine these two channels in our analysis.

5.1.3. Investors

Investors who are interested in investing in a debt security can buy the security either directly from the primary market or from the secondary market after the issuance. According to our estimate discussed in Section 4, the secondary market is illiquid with a large trading cost of 10.11 bps, which is even greater than the average overpricing in the primary market. As a result, these investors are still better off acquiring the security in the primary market even if they are aware of the presence of issuance overpricing.

5.1.4. Regulator

Market regulator NAFMII issued a regulation to ban underwriters' use of rebates after October 1, 2017. This ban was motivated by a key concern that the use of rebates is opaque to the public and may corrupt the fairness and quality of the issuance process.[26] Rebates allow the underwriter to boost the issuance price by simply using part of the underwriting fee to subsidize some of the participants in the issuance auction without having to disclose to the public whether and how rebates are used in the underwriting process. In contrast, to boost the issuance price by direct bidding, the underwriter requires sufficient capital for bidding more than its own investment need and must expose its own account to potential risk.[27] These constraints limit the underwriter's overbidding through its own account. Thus, by making the issuance process more transparent, the rebate ban may improve the fairness and quality of the issuance process. We later examine the change in the quality of issuance price after the rebate ban.

5.2. Underwriter repeat business

As described by our conceptual framework, the underwriter's incentive to keep the issuer's future issuance business is a key mechanism that drives issuance overpricing. We first examine this incentive effect—that an underwriter's current underwriting performance is positively related to its probability of being retained by the issuer in the next issuance.

We measure the performance of an underwriter in an issuance by comparing the issuance spread to a benchmark spread, specifically, the average issuance spread of all comparable issuances in the interbank market. A comparable issuance must meet three conditions: (1) It must have the same rating as the referenced issuance; (2) the maturity difference between a comparable issuance and the referenced issuance must be less than one month; and (3) a comparable issuance must be within a one-month window before the referenced issuance. Because issuers prefer a lower issuance spread, we construct an indicator variable $Underperformed_{j,n}$ that equals 1 if issuer j's n^{th} issuance

[25] This practice is very different from the U.S. market, where underwriters do not usually acquire the issues for their own investment. To the contrary, in the U.S. market, underwriters tend to overallocate the issues so that they can provide support to the secondary market trading after the issuances, e.g., Bessembinder et al. (2020).

[26] See the regulation by NAFMII on September 1, 2017: *Distribution Agreement for Debt Financing Instruments of Non-financial Enterprises.*

[27] The underwriter may choose to sell its position later in the secondary market, but the illiquidity of the secondary market would prevent the underwriter from selling quickly and thus force the underwriter to bear the risk for at least a period of time.

Table 4
Logit regression of underwriter switching. This table reports the logit regressions of an issuer's underwriter change on the underwriter's performance in the issuer's last debt-security issuance. The dependent variable, $Switch_{j,n+1}$, equals 1 if issuer j changes the underwriters of its $n+1$th issuance as compared to its n^{th} issuance, and 0 otherwise. Performance is measured by an indicator variable, $Underperformed_{j,n}$, which equals 1 if the spread of issuer j's n^{th} issuance is greater than the corresponding benchmark spread. $Underwriter\ Share_{j,n}$ is the share purchased by the underwriter in issuer j's n^{th} issuance. Heteroskedasticity-consistent z-statistics clustered by issuance date are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent: $Switch_{j,n+1}$	Full sample (1)	Full sample (2)	Before ban (3)	After ban (4)	Full sample (5)
$Underperformed_{j,n}$	0.281***	0.212***	0.288***	0.105**	0.202***
	(8.77)	(5.87)	(5.73)	(2.01)	(5.26)
$Underwriter\ Share_{j,n}$					−0.222***
					(−3.46)
Ln(Issue Amount)		−0.017	0.067	−0.086	−0.018
		(−0.38)	(1.12)	(−1.19)	(−0.37)
Subscription Ratio		−0.022	−0.009	−0.040	−0.038*
		(−1.02)	(−0.29)	(−1.38)	(−1.67)
Maturity		−0.037***	−0.020	−0.054***	−0.039***
		(−3.18)	(−1.26)	(−3.12)	(−3.14)
Ln(Trading Volume)		−0.034	0.026	−0.065	−0.052*
		(−1.18)	(0.69)	(−1.45)	(−1.70)
First Issue Dummy		−0.140	−0.011	−0.344**	−0.141
		(−1.40)	(−0.09)	(−2.27)	(−1.32)
Recent Issuance Dummy		0.785***	0.709***	0.878***	0.791***
		(11.08)	(7.21)	(8.50)	(10.38)
$Dummy_{AAA}$		0.789***	0.612**	0.563***	0.939**
		(3.11)	(2.35)	(5.03)	(2.18)
$Dummy_{AA+}$		0.529**	0.446*	0.183**	0.660
		(2.13)	(1.78)	(2.17)	(1.55)
$Dummy_{AA}$		0.355	0.300		0.523
		(1.45)	(1.22)		(1.24)
Leverage		1.002***	1.243***	0.824***	1.066***
		(5.63)	(5.20)	(3.13)	(5.71)
ROA		−1.990**	−0.965	−3.495**	−1.950**
		(−2.14)	(−0.85)	(−2.14)	(−1.96)
Ln(Asset)		0.240***	0.154***	0.270***	0.272***
		(6.51)	(3.04)	(4.78)	(6.92)
Ln(Sales)		0.033**	0.038	0.052**	0.042**
		(2.12)	(1.58)	(2.40)	(2.54)
Ln(Cash)		−0.139***	−0.112***	−0.188***	−0.166***
		(−5.21)	(−3.02)	(−4.83)	(−5.90)
Constant	0.390***	−2.815***	−3.290***	−1.698***	−2.962***
	(17.77)	(−7.83)	(−7.90)	(−3.82)	(−5.80)
Observations	16,920	15,958	8,131	7,827	14,311
Pseudo R-squared	0.00331	0.0575	0.0537	0.0621	0.0599

spread is larger than its benchmark spread, and 0 otherwise. We also define an indicator variable $Switch_{j,n+1}$ to measure a change of underwriter. $Switch_{j,n+1}$ is equal to 1 if issuer j replaces the underwriter for its $n+1$th issuance after the n^{th} issuance, and 0 otherwise. We run a logit regression with the underwriter-switch dummy $Switch_{j,n+1}$ as the dependent variable and the indicator variable, $Underperformed_{j,n}$, as the main explanatory variable. We use various issuance and issuer characteristics as controls. The issuance-level controls include issuance amount, subscription ratio, maturity, and secondary market liquidity, which is measured by the logarithm of the total trading volume of the debt security in the first month after issuance, the *First Issue* dummy, the *Recent Issue* dummy, and credit rating. The issuer-level controls include leverage, ROA, and the logarithm of firm book assets, annual sales, and cash holdings.

In columns (1) and (2) of Table 4, the coefficient of $Underperformed_{j,n}$ is positive and statistically significant, with and without the inclusion of the issuer and issuance characteristics as controls. This coefficient is also economically significant. Taking column (1) for example, the estimate for the coefficient of $Underperformed_{j,n}$ implies that if the current issuance underperforms the comparable issuances, the probability of the underwriter's being replaced will increase by about 8.3% in the next issuance. Because issuance overpricing dropped significantly after the ban on underwriter rebates, we further examine the effect of issuance performance before and after this rebate ban and report results in columns (3) and (4). After the rebate ban, the effect is reduced but remains significant, which is consistent with the notion that the rebate ban makes it more difficult for underwriters to drive up the issuance price. Column (5) adds an independent variable, $Underwriter\ Share_{j,n}$, the share acquired by the underwriter in issuer j's n^{th} issuance, to the right-hand side of the regression. The coefficient of $Underperformed_{j,n}$ remains positive and significant, while the coefficient of *Underwriter*

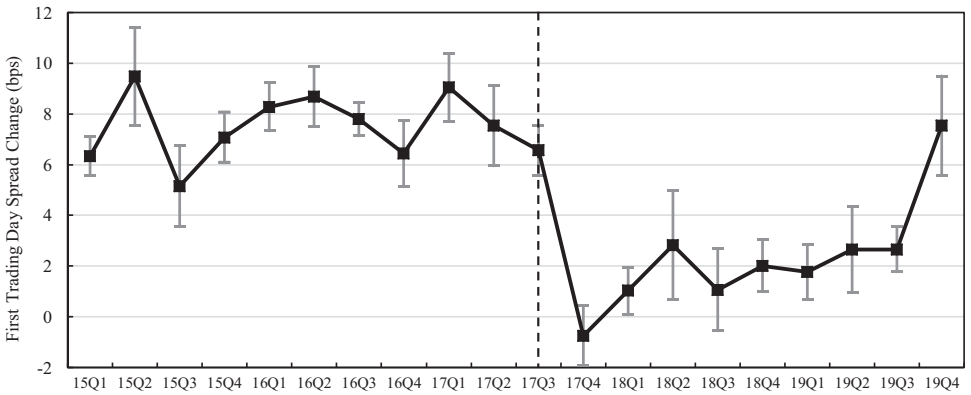

Fig. 2. Issuance overpricing over time. This figure plots the quarterly issuance overpricing along with their 95% confidence intervals from 2015 to 2019. The standard error is clustered by issuance date.

$Share_{j,n}$ is negative, indicating the underwriter's own purchase reduces its likelihood of being replaced in the next issuance.

In sum, Table 4 shows that driving up issuance prices and acquiring a larger share in issuance are associated with a lower probability of the underwriter being replaced in the subsequent issuance. This association is consistent with the aforementioned incentive effect. A potential concern is that this association could be driven by omitted variables unrelated to the underwriter's incentive. To address this concern, we will examine the cross section of issuance overpricing and the channels through which underwriters could generate issuance overpricing.

5.3. The underwriter rebate channel

As discussed earlier, rebates may serve as a key channel for underwriters to boost the issuance price. Concerned by the potential adverse effects of the use of rebates on the quality of the issuance process, NAFMII issued a new regulation to ban underwriters from using rebates after October 1, 2017. We now use this policy shock to examine the effects of rebates on issuance overpricing.

Fig. 2 depicts quarterly issuance overpricing from 2015 to 2019. It shows overpricing dropped significantly after the rebate ban, from roughly 6 bps in the third quarter to 0 in the fourth quarter of 2017. The sharp drop in issuance overpricing after the rebate ban is consistent with the notion that rebates served as a key channel for underwriters to boost issuance prices. Nevertheless, one may still argue the drop in issuance overpricing might have been caused by unobservable factors other than the rebate ban. To fully examine this issue, we adopt a difference-in-differences method to examine how this policy shock affected issuance overpricing across issuances with different issuers and different underwriters. Because underwriters have greater incentives to compete for the issuance business of central SOEs, we expect the rebate ban to cause greater reductions in overpricing of issuances by central SOEs. Similarly, because the Big Four banks are more-secured underwriters, we expect the rebate ban to cause smaller reductions in overpricing of issuances underwritten by the Big Four banks.

5.3.1. Reduction in overpricing across issuers

First, we use central SOEs as the treatment group and other firms as the control group. We expect the rebate ban to generate a greater reduction in overpricing of issuances by central SOEs. To test this prediction, we conduct a difference-in-differences analysis in a 12-month window around the rebate ban, controlling for a host of issuance and issuer-level characteristics, as specified below:

$$\Delta\text{Spread}_{i,j,t} = \theta_0 + \theta_1\text{Treat}_j + \theta_2\text{Post}_t + \theta_3\text{Treat}_j \times \text{Post}_t + \sum \theta_m\text{Control}_{m,i,j} + \varepsilon_{i,j,t} \quad (3)$$

where $\Delta\text{Spread}_{i,j,t}$ is the overpricing of issuance i by firm j on day t. Treat_j is an indicator that equals 1 for issuances by central SOEs, and 0 otherwise. Post_t is an indicator that equals 1 in the months following the rebate ban, and 0 otherwise. Like the regression analysis reported in Table 4, we use the same set of issuance and issuer characteristics as controls.

Table 5 reports the results in columns (1) and (2), without and with the control variables, respectively. The coefficient of Treat_j is positive, indicating that issuances by central SOEs are associated with greater overpricing before the rebate ban. More important, the difference-in-differences estimate, that is, the coefficient of $\text{Treat}_j \times \text{Post}_t$, is significantly negative, confirming that the overpricing of issuances by central SOEs dropped more after the rebate ban than issuances by the control group, specifically, by 7.2 bps without including the controls and by 6.2 bps after including the controls. Some of the control variables are highly significant. For example, more subscription is associated with lower overpricing, while large issuers tend to have greater overpricing.

One caveat of the analysis reported above is that issuance is endogenous and the composition of issuers might have changed after the rebate ban. Because the control variables might not be sufficient to measure the composition change, one might be concerned that the difference-in-differences measure is biased. To address this

Table 5
Effect of the rebate ban on overpricing: variation across issuers. This table reports results of the difference-in-differences analysis of how the rebate ban affected issuance overpricing. The sample includes all MTN and CP issued by nonfinancial firms in China's interbank market from April 1, 2017, to March 31, 2018, a 12-month window around the rebate ban on October 1, 2017. Treat equals 1 if the issuance is by a central SOE, and 0 otherwise. Post equals 1 in the months following the rebate ban. Columns (1) and (2) use the full sample. Columns (3) and (4) use the matched sample, which includes only sequential issuances before and after the rebate ban. Heteroskedasticity-consistent *t*-statistics clustered by issuance date are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Full sample		Matched sample	
Dependent: ΔSpread (bps)	(1)	(2)	(3)	(4)
Treat	9.709***	6.441***	9.772***	6.545***
	(6.37)	(4.50)	(5.06)	(3.54)
Post	−6.043***	−6.273***	−7.043***	−7.139***
	(−10.70)	(−11.17)	(−9.16)	(−9.48)
Treat × Post	−7.225***	−6.182***	−8.407***	−7.861***
	(−3.62)	(−3.22)	(−3.65)	(−3.71)
Ln(Issue Amount)		0.430		1.839*
		(0.67)		(1.87)
Subscription Ratio		−0.741***		−0.950**
		(−3.50)		(−2.29)
Maturity		−1.206***		−1.636***
		(−8.81)		(−7.06)
Ln(Trading Volume)		−0.071		−0.282
		(−0.19)		(−0.47)
First Issue Dummy		0.624		2.420
		(0.96)		(0.98)
Recent Issuance Dummy		0.113		0.197
		(0.22)		(0.10)
$Dummy_{AAA}$		0.068		−1.017
		(0.10)		(−0.88)
$Dummy_{AA+}$		−0.335		−0.912
		(−0.84)		(−1.44)
Leverage		−2.215		−4.098
		(−1.35)		(−1.51)
ROA		12.641**		11.949
		(2.10)		(1.06)
Ln(Asset)		1.537***		1.861**
		(3.50)		(2.58)
Ln(Sales)		−0.067		−0.180
		(−0.47)		(−0.84)
Ln(Cash)		−1.078***		−1.356***
		(−3.54)		(−3.01)
Constant	6.203***	1.379	7.659***	−3.606
	(14.65)	(0.42)	(12.11)	(−0.64)
Observations	3,252	3,164	1,481	1,445
R-squared	0.153	0.210	0.182	0.246

concern, we further take advantage of another interesting feature of China's interbank market: issuers can register issuances of debt securities with NAFMII in multiple installments. These issuances usually have the same terms and ratings, along with many other characteristics as stated in the registration documents. The change in the overpricing of preregistered sequential issuances by the same issuer allows us to control for the potential change in the composition of issuers.

Specifically, we construct a subsample of preregistered sequential issuances that spanned the rebate ban. This subsample of sequential issuances is slightly less than half of the full sample, containing 1,481 or 1,445 issuances for the regressions without or with controls. Columns (3) and (4) report the regression results from using this subsample. The difference-in-differences estimate remains significantly negative, with magnitudes very similar to the full sample. The control variables also have estimates similar to those of the full sample.

5.3.2. Reduction in overpricing across underwriters

Next, we examine the impact of the rebate ban across issuances with different underwriters. We use the Big Four banks as the treatment group. We continue to use the regression specification in Eq. (3) with the treatment group dummy Treat being equal to 1 if the issuance is underwritten by a Big Four bank, and 0 otherwise. Like before, we conduct a difference-in-differences analysis in the 12-month window around the rebate ban, using both the full sample and the subsample of sequential issuers, and the same set of control variables. We report estimates of the main coefficients in Table 6, leaving out the coefficients of control variables to save space. The difference-in-differences estimate is significantly positive in all specifica-

Table 6
Effect of the rebate ban on overpricing: variation across underwriters. This table reports results of the difference-in-differences analysis of how the rebate ban affected issuance overpricing. The sample includes all MTN and CP issued by nonfinancial firms in China's interbank market from April 1, 2017, to March 31, 2018, a 12-month window around the rebate ban on October 1, 2017. Treat equals 1 if the issuance is underwritten by one of the Big Four banks in China, and 0 otherwise. Post equals 1 in the months following the rebate ban. Columns (1) and (2) use the full sample. Columns (3) and (4) use the matched sample, which includes only sequential issuances before and after the rebate ban. Heteroskedasticity-consistent *t*-statistics clustered by issuance date are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Full sample		Matched sample	
Dependent: ΔSpread (bps)	(1)	(2)	(3)	(4)
Treat	−0.791	−1.536***	−2.459***	−2.698***
	(−1.39)	(−2.89)	(−2.96)	(−3.35)
Post	−7.187***	−7.363***	−9.147***	−8.842***
	(−11.51)	(−12.04)	(−10.00)	(−10.20)
Treat × Post	1.362*	1.616**	2.712**	2.316**
	(1.89)	(2.37)	(2.51)	(2.34)
Issuance Controls	No	Yes	No	Yes
Firm Controls	No	Yes	No	Yes
Constant	7.239***	−4.492	9.699***	−10.431*
	(15.17)	(−1.40)	(12.35)	(−1.87)
Observations	3,252	3,164	1,481	1,445
R-squared	0.119	0.200	0.149	0.232

tions, confirming that the rebate ban has a smaller impact on overpricing of issuances underwritten by the Big Four banks. Taking the coefficient in column (4) for example, the impact of the rebate ban on overpricing of issuances underwritten by the Big Four banks is 2.3 bps smaller than that of other issuances.

Together, Tables 5 and 6 provide cross-sectional evidence from the rebate ban to a finding that underwriter incentives and the use of rebates combine to form an important mechanism to generate issuance overpricing before the rebate ban. Interestingly, Fig. 2 shows that even after the rebate ban, issuance overpricing remained significant. This observation suggests that additional channels are at work, which we examine in the next section.

5.4. The underwriter bidding channel

Because most of the licensed underwriters are banks, they regularly purchase debt securities in the primary market for their own investment accounts. In this section, we examine how underwriters' self-purchases are related to issuance overpricing. Our discussion in Section 5.1 argues that, motivated by the incentive to keep the issuer's future business, an underwriter may purchase more at its own loss in the issuance auction to drive up the issuance price. That is, the underwriter's self-purchase is positively correlated with overpricing. This overbidding hypothesis contrasts two alternative hypotheses. To the extent that liquidity problems in the market and informational frictions could lead to a lack of investor demand for an issuance, the underwriter could offer price support or take advantage of potential underpricing by purchasing the issuance for its own account. If so, two possibilities exist regarding the return performance of the underwriter's self-purchase: (1) It may offer a superior return if the issuance price is still below the fundamental value, or (2) it may offer a normal return if the issuance price is right at the fundamental value. We call the first possibility the information-advantage hypothesis, because it is consistent with a standard argument that the underwriter uses its information advantage to take advantage of underpricing in the issuance. We call the second possibility the price-support hypothesis, because the underwriter purchases to support the issuance price at the fundamental level.

Panel A of Table 7 provides summary statistics of underwriter purchases across issuances sorted by different characteristics. The underwriter's share of purchase, *Underwriter Share*, is 0.37 in issuances with overpricing, which is substantially larger than its value of 0.29 in issuances without overpricing. The larger share purchased by the underwriter in issuances with overpricing is consistent with potential overbidding by the underwriter. We note a limitation of our data, which do not differentiate an underwriter's bidding in the auction for its own account or its clients. To the extent that the clients are unlikely to repeatedly subsidize the underwriter's overbidding, it is reasonable to conjecture that the underwriter might have used rebates to compensate its clients before the rebate ban. Interestingly, the table also shows that *Underwriter Share* dropped from 0.44 before the rebate ban to 0.27 after the rebate ban. This sharp drop is consistent with the possibility that underwriters used rebates to compensate their clients for their overbidding before the rebate ban, but must rely on overbidding for their own accounts after the rebate ban.[28]

[28] As we discussed in footnote 6, the Chinese banking regulations require banks to establish a firewall system so that the bank-level risk management can limit the transfer of underwriting risk to banks' own balance

Table 7
Underwriter purchases and overpricing. Panel A reports summary statistics of the share purchase by the underwriter, *Underwriter Share*, across issuances with and without overpricing, as well as across different ratings, issuer and underwriter types, and sample periods. Number of observations, the mean, the standard deviation, the 25th percentile, the median, and the 75th percentile are presented. Our sample is from 2015 to 2019, and the rebate ban became effective on October 1, 2017. Panel B reports the average overpricing (in basis points) of issuances acquired by qualified investors (column 1), acquired by licensed underwriters but underwritten by others (column 2), and acquired and underwritten by the same licensed underwriters (column 3). We first calculate both the equal-weighted average spread change and the value-weighted average spread change (using purchase amount as the weight) for each institution and then take the average across the institutions in each category. Panel B also reports *t*-statistics for the differences between (1) and (3) and between (2) and (3), with *, **, and *** indicating statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A. Summary statistics of underwriter purchase

Underwriter purchase by overpricing	N	Mean	SD	P25	P50	P75
Overpriced issuances	11,058	0.37	0.31	0.10	0.32	0.60
Other	5,326	0.29	0.29	0.00	0.20	0.46
Underwriter purchase by rating						
AAA	7,321	0.38	0.32	0.10	0.31	0.60
AA+	5,239	0.29	0.28	0.00	0.22	0.50
AA	3,720	0.35	0.31	0.06	0.30	0.56
AA- and *A*+	104	0.60	0.32	0.30	0.68	0.86
Underwriter purchase by issuer type						
Central SOE	1,405	0.49	0.31	0.23	0.47	0.74
Other	14,979	0.33	0.30	0.05	0.27	0.54
Underwriter purchase by underwriter type						
Big Four banks	5,594	0.36	0.30	0.10	0.30	0.56
Other	10,790	0.34	0.31	0.05	0.27	0.56
Underwriter purchase by rebate ban						
Before rebate ban	7,191	0.44	0.30	0.20	0.44	0.68
After rebate ban	9,193	0.27	0.29	0.00	0.20	0.41

Panel B. Overpricing of issuances acquired by qualified investors and licensed underwriters

	Overpricing of issuances acquired by qualified investors (1)	Overpricing of issuances acquired by licensed underwriters but underwritten by others (2)	Overpricing of issuances acquired and underwritten by the same licensed underwriters (3)	Difference (3)-(1)	Difference (3)-(2)
Equal-weighted portfolio average					
Full sample	1.54	2.19	3.85	2.32***	1.67***
Before rebate ban	4.95	5.39	7.35	2.40**	1.96**
After rebate ban	0.66	1.01	2.19	1.52**	1.18**
Value-weighted portfolio average					
Full sample	1.57	2.95	6.40	4.83***	3.45***
Before rebate ban	5.49	5.80	8.15	2.65**	2.35**
After rebate ban	0.50	1.50	5.61	5.11***	4.11***

To examine the three aforementioned hypotheses, we compare how overpricing varies across issuances that are acquired by qualified investors without an underwriting license and issuances acquired by licensed underwriters. Panel B of Table 7 reports the average overpricing in three portfolios of issuances: (1) issuances acquired by qualified investors, (2) issuances acquired by licensed underwriters but underwritten by others, and (3) issuances acquired by licensed underwriters that they themselves underwrote. We first calculate the average overpricing for each institution and then take the average across the institutions in each category. The first row uses an equal-weighted average, and the second row uses a value-weighted average.

Interestingly, overpricing in Portfolio 3 is significantly higher than in Portfolio 1 by 2.32 bps in the equal-weighted average and by 4.83 bps in the value-weighted average. This difference contradicts the hypotheses that underwriters use their information advantage to acquire undervalued issuances and that underwriters purchase the issuances to provide price support at the fundamental values. Instead, it supports the overbidding hypothesis, which is that underwriters bid in issuance auctions to generate overpricing. Overpricing in Portfolio 3 is also significantly higher than in Portfolio 2 by 1.67 bps in the equal-weighted average and by 3.45 bps in the value-weighted average. This difference further shows that underwriters generate losses by bidding in issuances they underwrite.[29]

We also examine these portfolios' overpricing before and after the rebate ban. Note that although overpricing of Portfolio 1 dropped close to 0 after the rebate ban, the overpricing of Portfolio 3 remained significantly positive. Moreover, the difference between Portfolios 3 and 1 and

sheets. This system thus constrains underwriters from using self-purchase to maintain the same level of issuance overpricing after the rebate ban.

[29] Although underwriters in other more developed countries do not usually support the issuance prices by acquiring the issues for their own investment, mutual funds affiliated with investment banks may have engaged in such activities. Ber et al. (2001) and Hao and Yan (2012) provide evidence from Israel and the U.S. to show that investment bank-affiliated mutual funds underperform unaffiliated funds due to their disproportionately large holdings of equity IPOs underwritten by their affiliated investment banks. This evidence suggests that investment bank-affiliated funds might have offered price support in the underwriting process.

Table 8
Regressions of overpricing on underwriter purchases. This table reports regressions of issuance overpricing on the share purchase by the underwriter. The dependent variable is the overpricing measure, ΔSpread. The independent variable *Underwriter Share* is the share purchased by the underwriter. Columns (1) and (2) report regression results for the full sample. Columns (3) and (4) report regression results for issuances before and after the rebate ban, respectively. Heteroskedasticity-consistent *t*-statistics clustered by issuance date are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent: ΔSpread (bps)	Full sample (1)	Full sample (2)	Before ban (3)	After ban (4)
Underwriter Share	10.494***	9.118***	1.802**	14.943***
	(17.32)	(16.43)	(2.06)	(12.71)
Issuance Controls	No	Yes	Yes	Yes
Firm Controls	No	Yes	Yes	Yes
Constant	1.004***	−8.392***	−1.458	−3.128
	(4.10)	(−5.13)	(−0.78)	(−0.91)
Observations	16,384	15,465	7,091	8,374
R-squared	0.069	0.120	0.118	0.144

Table 9
Quality of issuance price. This table reports regressions of issuance yield spread on issuance and issuer characteristics. The dependent variable is $Spread_{issuance}$, measured as the coupon rate minus Treasury yield with similar maturity. Columns (1)–(4) report the regression results for all issuances in each of the four years around the rebate ban, respectively. Heteroskedasticity-consistent *t*-statistics clustered by issuance date are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent: $Spread_{issuance}$ (%)	Two years before rebate ban (1)	One year before rebate ban (2)	One year after rebate ban (3)	Two years after rebate ban (4)
Ln(Issue Amount)	−0.001	−0.055***	−0.156***	−0.164***
	(−0.03)	(−2.78)	(−5.95)	(−6.24)
Maturity	0.095***	0.103***	0.087***	0.108***
	(12.81)	(10.53)	(9.95)	(12.58)
First Issue Dummy	0.067	−0.158***	0.018	0.051
	(1.11)	(−2.74)	(0.30)	(0.61)
Recent Issuance Dummy	0.044	−0.038	0.136***	0.041
	(0.83)	(−0.83)	(2.86)	(0.70)
$Dummy_{AAA}$	−2.930***	−1.507***	−1.897***	−1.835**
	(−20.11)	(−8.89)	(−6.03)	(−2.43)
$Dummy_{AA+}$	−2.391***	−0.901***	−0.990***	−0.783
	(−17.07)	(−5.37)	(−3.20)	(−1.03)
$Dummy_{AA}$	−1.728***	−0.383**	−0.347	0.022
	(−12.55)	(−2.30)	(−1.13)	(0.03)
Leverage	0.472***	0.796***	0.603***	1.032***
	(4.89)	(6.92)	(4.84)	(7.83)
ROA	−4.691***	1.409*	0.174	−0.370
	(−6.56)	(1.90)	(0.23)	(−0.58)
Ln(Asset)	−0.163***	−0.079***	−0.105***	−0.124***
	(−6.99)	(−3.22)	(−4.04)	(−4.33)
Ln(Sales)	0.173***	0.082***	0.062***	0.100***
	(14.80)	(6.68)	(5.46)	(9.53)
Ln(Cash)	0.066***	0.117***	0.150***	0.121***
	(4.81)	(6.81)	(8.59)	(5.86)
Constant	2.884***	1.573***	3.136***	2.465***
	(15.50)	(6.33)	(9.55)	(3.16)
Observations	3,610	2,942	3,562	4,517
R-squared	0.339	0.348	0.436	0.392

Portfolios 3 and 2 remain significant both before and after the rebate ban, suggesting that underwriters continue to overbid in their own issuances.

We further explore the relationship between overpricing and *Underwriter Share* by using the following regression:

$$\Delta Spread_{i,j} = \theta_0 + \theta_1 \ Underwriter\ Share_i + \Sigma\theta_m Control_{m,i,j} + \varepsilon_{i,j}. \quad (4)$$

Table 8 reports the results. Columns (1) and (2) show that the coefficient of *Underwriter Share* is positive and statistically significant, without and with controls, respectively, for the same list of issuance and issuer characteristics used in the earlier regressions. This positive relationship is inconsistent with both the information-advantage hypothesis and the price-support hypothesis. Instead, it supports the overbidding hypothesis. We also examine this relationship before and after the rebate ban and report the results in columns (3) and (4). The coefficient of *Underwriter Share* increases from 1.80 before the rebate ban to 14.94 after the ban, suggesting that the cross-sectional re-

lationship between the underwriter's own bidding and the issuance overpricing is substantially strengthened after the rebate ban.

5.5. Quality of issuance price

Market regulator NAFMII issued the rebate ban due to the concern that underwriters' use of rebates is opaque and may corrupt the fairness and quality of the underwriting process. As we discussed in Section 5.1, this rebate ban may help to improve the transparency and thus the quality of the issuance process. We now examine this effect.

It is challenging to fully measure the quality of the issuance process. Instead, we focus on a particular dimension, specifically, the quality of the issuance price. We measure the ability of observable economic fundamentals to explain the issuance price. To the extent that a high-quality issuance process makes the issuance price more informative of the economic fundamentals, we expect the fundamentals to have greater explanatory power for the issuance price after the rebate ban. The literature uses similar approaches. Collin-Dufresne et al. (2001) report that a significant portion of the variation in credit spreads can be explained by issuer-level fundamental variables. In a follow-up study, Bao (2009) reports that these fundamental variables can explain as much as 45% of the cross-sectional variation of the credit spread in the U.S. corporate bond sample. Furthermore, Geng and Pan (2020) use the ability of observable economic fundamentals to explain the credit spread as a key variable to justify the SOE premium in China's credit market.

Table 9 reports the results from regressing the issuance price on a set of issuance and issuer characteristics for all issuances in each of the four years around the rebate ban: two years and one year before the rebate ban in columns (1) and (2) and one year and two years after the rebate ban in columns (3) and (4). Interestingly, the regression *R*-squared increases from 0.339 and 0.348 in the two years before the rebate ban to 0.436 and 0.392 in the two years after the rebate ban. This increase in the regression *R*-squared suggests that after the rebate ban, we see not only lower issuance overpricing, but also a greater fraction of the variation in issuance price being explained by the observed economic fundamentals.

6. Conclusion

This paper documents pervasive overpricing in the issuances of China's corporate debt securities. This overpricing is present in different subsamples of issuances divided by credit rating, maturity, firm size, issuing history, issuer and underwriter types, and issuance year, and is in sharp contrast to widely observed underpricing of equity and debt-security issuances in Western countries. While issuance overpricing dropped substantially from an average of 7.4 bps to 2.4 bps after the government prohibited underwriters from using rebates in October 2017, it remained highly significant.

Our analysis attributes the pervasive issuance overpricing to the distinct institutional environment and issuance process in China's interbank market. Higher issuance pricing is associated with a higher probability of the underwriter being retained by the issuer for its future issuances, giving the underwriter an incentive to drive up the issuance price. The underwriter can affect the issuance price through two possible channels, either by offering rebates or by overbidding for its own account. The distinct institutional arrangements in China's interbank market motivate many more questions for future studies, such as the asset pricing implications of these arrangements and the efficiency of the issuance process. Addressing these issues may require a direct comparison of the specific arrangements adopted by China and Western countries.

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