Why Do City Commercial Banks in China Issue Green Bonds? Exploring Policy Drivers, Government Preferences, and Bank Motivations

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Funding: This work was supported by the General Program of the National Natural Science Foundation of China under Grant number 72273047 and 72474161; The funding support from the GRF Proposal Early Submission Incentive Scheme, provided by the Faculty of Law, The Chinese University of Hong Kong, is duly acknowledged.

Acknowledgement: We thank Dr. Dina Azhgaliyeva for her great support in data accessibility, and Ms. Ziyi Cheng, Mr. Yiyang Xiong and Mr. Xueliang Zhang for their excellent research assistance.

Declaration of Interest statement: None.

Authors' contributions: Banban Wang: Conceptualization, Methodology; Supervision; Writing - original draft, review & editing; Funding acquisition. Ruochan Xiong: Formal analysis; Data curation; Visualization; Writing - original draft. Hao Zhang: Conceptualization, Data curation, Writing - review & editing; Supervision. Xiujie Tan: Conceptualization, Writing - review & editing; Supervision.

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Abstract

This paper investigates the drivers of green bond issuance by Chinese city commercial banks (CCBs), focusing on policy incentives, bank motivations, and local government preferences. At the policy level, Green Finance Reform and Innovation Pilots increase the probability of issuance by 0.25 and double both the number and value of green bonds issued. From the issuer's perspective, CCBs are motivated by financing needs, due to limited access to other bond channels, and reputational concerns linked to prior regulatory penalties or low ESG scores. On the government side, cities with fewer pilot opportunities and those led by officials with stronger promotion incentives exert greater implementation pressure. However, neither banks' nor local governments' green preferences serve as primary drivers, raising concerns about greenwashing. As a result, the pilots have only a limited impact in promoting genuine green bonds. These findings provide insights into strengthening green finance frameworks by aligning policy design with the incentives of both financial institutions and local governments to more effectively support China's green transition.

Keywords: Green bonds; City commercial banks; ESG; Driving factors; Policy incentives; Green finance policies; China

1. Introduction

In recent years, the global energy transition has gained momentum. Over 130 countries have committed to achieving net-zero emissions, prompting urgent action to address the significant shortfall in climate finance. Global investment in clean energy reached US$2 trillion in 2024, but a doubling is still required to meet climate goals (IEA, 2024). Traditional public financing mechanisms fall far short of meeting these needs. Against this backdrop, green finance has emerged as a critical enabler of the transition. Green bonds, which are specialised debt instruments issued by governments, corporations, banks, and other financial institutions to fund projects aligned with green economic standards, play a particularly important role. These bonds help mobilise private capital and offer more competitive returns for green investments.

Green bond markets, however, are shaped by high risks and environmental externalities (Ehlers and Packer, 2017; MacAskill et al., 2021). Understanding what drives different issuers to participate in this market is therefore essential to scaling it up. While previous research has largely focused on the motivations of listed companies (Flammer, 2021) and on issues such as green premiums (Feldhütter et al., 2024), much less attention has been paid to another important group of issuers: commercial banks, particularly small and medium-sized ones. Given the central role of commercial banks in financial intermediation, uncovering the motivations behind bank-issued green bonds is of considerable significance.

This article examines the motivations of Chinese city commercial banks (CCBs) in issuing green bonds. Several factors inform the selection of this research focus. First, China is the largest green bond market in the world. By 2023, the volume of green bonds issued in China had reached RMB 844.8 billion (yuan), with an average annual growth rate of 22.7% (CCDC, 2024). Second, green bond issuance in China is highly policy-driven (Flammer, 2021). Since the late 2015, the Chinese central government agencies have gradually established the policy and regulatory framework that underpin China's green finance system, including green bonds, with local experimentations being carried out to test the efficacy and effectiveness of policy incentives. This provides a useful context for analysing the role of government policy in influencing issuance behaviour. Third, commercial banks, especially CCBs, a category of regionally focused small and medium-sized banks, have become major players in China's green bond market. Although banks are often seen as underwriters (Fang, 2005), data from our sample shows that commercial banks account for 80% of the total green bond issuance by Chinese banks. Among them, CCBs represent 45% of issuers and are responsible for 62% of the issuance volume in the banking sector (Fig. 1). As regionally embedded financial institutions, CCBs are particularly responsive to local economic conditions and policy directives. Their unique positioning allows us to explore how local government priorities shape the behaviour of local financial actors in China's green finance landscape.

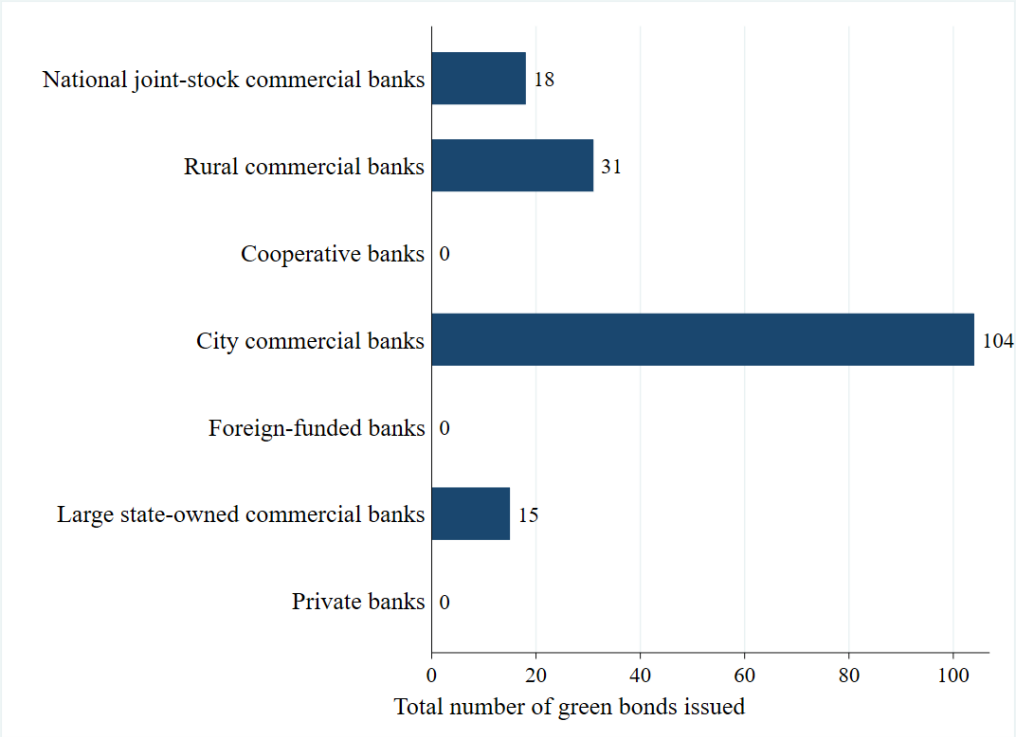


Fig. 1. The total number of green bonds issued by each type of bank, 2015-2020; compiled by authors based on bank-level green bond issuance data

This paper addresses three core questions: What motivates CCBs to issue green bonds? To what extent are government policies the primary driver? And how do local government preferences interact with bank-level incentives to shape issuance patterns? To investigate these questions, we compiled a bank-level panel data covering green bonds issued by CCBs in China between 2015 and 2022. Each bond issuance was matched with financial and economic activity data for both the issuing banks and their respective cities, enabling a nuanced analysis of the institutional and contextual factors influencing green bond issuance.

Our findings first highlight the strong policy-driven nature of green bond issuance by CCBs in the Chinese context. Owing to the high-risk profile and long investment horizons associated with green bonds, private-sector actors often lack sufficient incentive to issue them (Ehlers and Packer, 2017; MacAskill et al., 2021). To assess whether government policy can effectively stimulate local commercial banks to issue green bonds, we use the case of China's Green Finance Reform and Innovation Pilot Zones as a quasi-natural experiment. The green bond market in China officially began in earnest in late 2015, following the issuance of the *Guidelines for Green Bond Issuance* by the National Development and Reform Commission (NDRC) (NDRC, 2024). In 2017, the central government established the Green Finance Reform and Innovation Pilot Zones in nine cities across six provinces (hereinafter referred to as the "Six Provinces and Nine Cities"). The selection of pilot cities covered both economically advanced regions and less-developed areas in central and western China. This mixed composition reduces the likelihood that selection was driven by cities' pre-existing willingness to issue green bonds, and instead reflects the policy goal of generating replicable lessons across

diverse local contexts. Moreover, pilot cities were granted substantial discretion to design supporting measures based on local conditions, resulting in meaningful policy variation within the pilot group itself. At the same time, many non-pilot cities also pursued their own green finance initiatives during the same period. This broader policy diffusion enables us to compare pilot and non-pilot cities and to identify the impact of city-level green finance efforts on the green bond issuance behaviour of CCBs. Since the launch of the pilot policy, CCBs in these cities have experienced significantly faster growth in green bond issuance (Fig. 2).

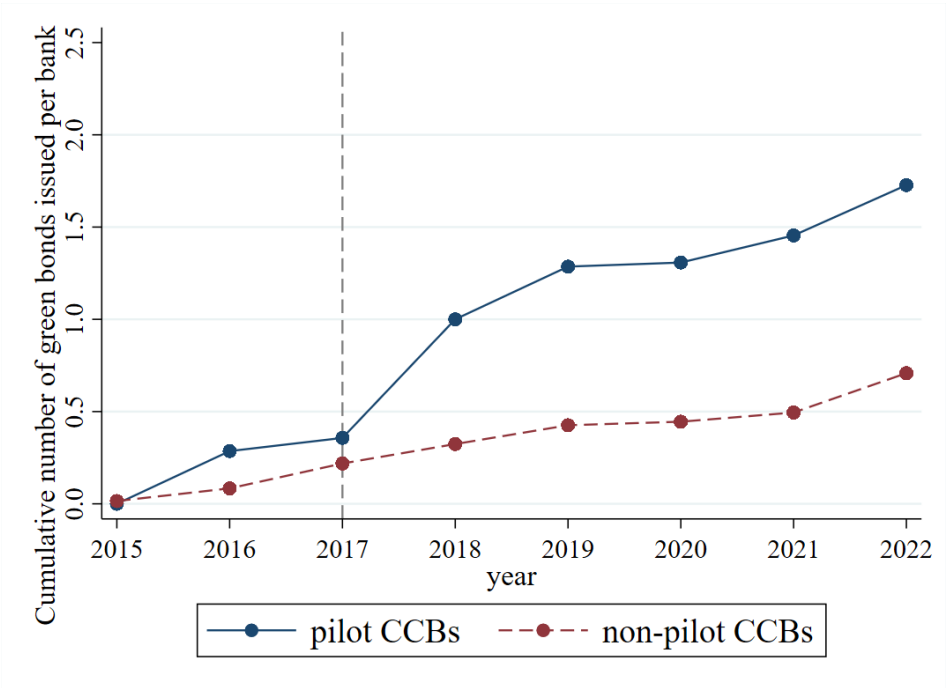


Fig. 2. The trend of cumulative green bond issuance by CCBs in pilot and non-pilot cities.

We then explore the motivations of CCBs through the lens of multiple stakeholders. First, from the issuers' perspective, we consider which characteristics of CCBs affect their internal decision-making processes around green bond issuance. During the early development of China's green bond market, concerns were raised about the credibility of green claims and the potential for "greenwashing" (Yeow and Ng, 2021). This raises a critical question: are CCBs genuinely motivated by environmental objectives, or are they primarily leveraging the green bond framework for easier access to financing? Second, given the close relationship between CCBs and local governments, we examine how specific local government preferences, notably the emphasis on environmental protection and performance-based governance, may influence the likelihood of green bond issuance (Liu et al., 2022).

The study finds that at the policy level, the Six Provinces and Nine Cities green finance pilots significantly boosted green bond issuance by CCBs located in pilot cities. In contrast, the financial characteristics of the banks themselves were not the primary determinants of issuance. At the bank level, the main drivers for CCBs include the need to repair reputational standing and secure funding, rather than project a green image. At the local government level, the performance incentives of local officials were found to play a significant role in shaping green

bond issuance patterns, while environmental policies mainly lead CCBs to cater to local governments' green preferences, resulting in only a modest increase in issuance events.

This paper makes several contributions to existing literature. First, it underscores the importance of government green finance policies in encouraging green bond issuance and links these policies to the motivations of micro-level actors such as commercial banks. Prior research has largely focused on green bond premiums (MacAskill et al., 2021; Feldhütter et al., 2024; Fatica et al., 2021), noting that such bonds attract environmentally conscious investors (Pineiro-Chousa et al., 2021) and may yield superior returns (Tan et al., 2022). For example, a relevant study indicates that regulatory arbitrage constitutes a significant motivation for commercial banks to issue green bonds (Cao et al., 2021). In contract, this study shifts the focus toward the role of institutional and regulatory contexts. Specifically, it highlights how government-led initiatives, such as green finance policies, can serve as critical external incentives for bank participation in the green bond market. This is particularly relevant in China, where enterprises, including banks, often operate under the direct or indirect influence of government policies. Although some studies have examined how central bank regulations or national energy strategies affect the overall scale of green bond markets (Mertzanis, 2023), few have connected these macro-level policies to the motivations of individual issuers.

Second, the paper broadens the discussion beyond purely environmental or "green" motivations, incorporating a range of institutional, financial, and political considerations that drive both issuers and local governments in a country's specific context. Prior studies have explored reputational drivers for green bond issuance, such as efforts to enhance corporate social image (Fatica et al., 2021; Tan et al., 2022) and have highlighted governmental motivations linked to environmental goals or nationally determined contributions (Tolliver et al., 2020). Some also raise concerns about corporate greenwashing (Laufer, 2003) and governments' interests in broader economic governance (Liu et al., 2022; Anh et al., 2020). This study extends these insights by showing that CCBs may issue green bonds not solely out of environmental concern but also to capitalise on policy incentives that ease financing constraints, a motivation that intersects with the risk of greenwashing. Moreover, banks may seek to improve their reputational standing by showcasing environmental performance, particularly in response to other reputational risks. Although such motivations are not intrinsically green, they may still generate positive outcomes for environmental and green finance development. At the governmental level, we also identify the political motivations of local officials, who may view green finance policy implementation as a pathway to demonstrate administrative performance, thereby intensifying green policy enforcement within their jurisdictions. This dimension has been largely overlooked in the existing literature.

The remainder of this paper is structured as follows. Section 2 discusses the institutional background and outlines the analytical framework and hypotheses. Section 3 describes the empirical strategy, including data and empirical design. Section 4 presents the baseline regression results. Section 5 explores the distinct motivations of banks and local governments in issuing green bonds. Section 6 concludes.

2. Institutional Background, Analytical Framework and Hypotheses

2.1. Institutional Context: China's Green Bond Policy and CCBs

Although China's green bond market emerged relatively late, it has expanded rapidly. The official launch came in 2015 when the NDRC issued the *Guidelines for Green Bond Issuance* (NDRC, 2015). This was followed in 2016 by the *Guiding Opinions on Building a Green Financial System*, jointly released by the People's Bank of China (PBoC), the Ministry of Finance, and seven other agencies, laying the foundation for a national green finance policy framework (PBoC et al., 2016). To guide market development, Chinese central government authorities have continued to refine regulatory tools. Notably, the *Catalogue of Green Bond Supported Projects (2021 Edition)*, issued by the PBoC, NDRC, and the China Securities Regulatory Commission, unified domestic classification standards and broadened project eligibility (PBoC et al., 2021). These efforts have channelled capital into the green bond market. As a result, green bond issuance surged from RMB 201.8 billion in 2016 to RMB 844.8 billion in 2023, making China the world's largest green bond market (China Central Depository and CCDC, 2024).

A key initiative was the 2017 launch of the "Six Provinces and Nine Cities" Green Finance Reform and Innovation Pilot Zones. These zones, covering cities such as Huzhou, Guangzhou, and Guiyang, provide targeted policy incentives to local institutions, particularly CCBs. Unlike top-down mandates, these pilot programmes empower cities to design locally tailored green finance policies, using voluntary and market-based mechanisms to encourage sustainable investment. Although the level of support may differ slightly across regions, the support mechanisms generally follow the guidance provided by the central government agencies. These local initiatives, when combined with central policy support, form a distinctive dual-track green finance regime. This study examines how central and local policy instruments jointly influence the green bond issuance behaviour of CCBs.

Within China's diverse banking system that comprises state-owned, joint-stock, city, and rural commercial banks, CCBs occupy a strategic niche. They serve local economic interests, attract deposits, and finance regional enterprises (Ferri, 2009). With larger asset bases than microfinance institutions, CCBs are often key conduits for local government funding objectives (Sun, 2013). Their close ties with local authorities also position them as effective intermediaries for policy transmission, using green bond proceeds to refinance environmentally beneficial projects (Chen et al., 2021). Moreover, their operations and strategies often reflect the economic profiles of their home cities. Analysing how green finance policies in the Six Provinces and Nine Cities pilot zones influence CCBs' green bond issuance thus offers insight into the effectiveness of these policies at the urban level.

2.2. Analytical Framework and Hypotheses

2.2.1. How Local Green Finance Policies Encourage CCBs to Issue Green Bonds

When lacking environmental policies, market failures impose a "dual cost constraint" on commercial banks issuing green bonds independently (MacAskill et al., 2021). First, environmental benefits exhibit positive externalities, meaning the benefits generated by green projects are difficult to fully internalise into issuers' financial returns. Second, green projects typically feature low returns and long investment cycles, leading to higher credit risk premiums than traditional projects (Sadorsky, 2012).

Green finance policies adopted by the Six Provinces and Nine Cities pilot zones mitigate these challenges through policy support. First, instruments like tax exemptions, fiscal interest subsidies, and risk compensation funds partially convert environmental benefits into economic returns (Sachs et al., 2019).[1] Second, regulatory authorities have reduced transaction costs by standardising green project certification, streamlining approvals, and subsidising issuance fees (Zhang et al, 2024).[2]

The institutional linkages with local governments makes CCBs structurally and strategically predisposed to align their financial instruments with local policy priorities. Typically, local governments serve as their primary shareholders, and CCBs direct most of their loans locally (Sun, 2013; Chen et al., 2021; Qian et al., 2015). The institutional embeddedness creates a strong channel for policy transmission. Issuing green bonds allows CCBs to obtain regulatory benefits such as additional points in the Macro Prudential Assessment, increased quotas for re-lending (Zhang et al., 2011), and other preferential support from local governments (Campiglio, 2016).

These institutional linkages and incentive structures collectively suggest that:
Hypothesis 1: Local government green finance policies promote green bond issuance by CCBs.

2.2.2. Reputational and Financing Motives of CCBs in Green Bond Issuance

(1) Reputational Motives
By issuing green bonds, commercial banks signal their commitment to fulfilling social responsibilities, thereby gaining the support of investors and other stakeholders. For socially responsible investors, green bond issuance strengthens trust and enhances their willingness to support the banks (Heinkel et al., 2001). For local governments promoting green development,

[1] For example, in Guangzhou's pilot zone, government-established incentive and risk compensation mechanisms (implemented since 2017) have internalised environmental benefits into financial value, increasing the financial sector's value added in Huadu District 65-fold over five years. (The People's Government of Guangzhou Municipality, 26 July 2022) <https://www.gz.gov.cn/ysgz/xwdt/ysdt/content/mpost_8433747.html>.

[2] In Huzhou's pilot zone, bank credit exceeding RMB 532.8 billion was facilitated for 43,600 enterprises by June 2024. During this period, the city's green loan balance rose from RMB 36.95 billion in 2017 to RMB 397.63 billion, reflecting an average annual growth rate of 44.1%. (China Finance, Issue 18, 2024) <https://zjic.zj.gov.cn/ywdh/nyhj/202409/t20240930_22885084.shtml>.

it creates opportunities for collaboration with CCBs (Geng and Doberstein, 2008). Thus, green bond issuance generates positive reputational effects for CCBs.

Reputational motivation operates through two distinct pathways, that is, banks may issue green bonds for reputational reasons, whether based on green or non-green preferences. In terms of green preferences, banks with established ESG ratings are more likely to issue green bonds to maintain or improve their ESG ratings, thereby raising investor awareness of their green actions. In terms of non-green preferences, banks may use green bond issuance to recover from negative reputations. This perspective can be traced back to Goffman's impression management theory (Goffman, 1959), which suggests that when faced with reputational risks, banks engage in positive social responsibility actions, such as issuing green bonds, to reshape their public image. For example, following administrative penalties imposed in 2019 for service violations (CBIRC, 2019), Ping An Bank issued its inaugural green financial bond in 2022 (Financial sector, 2022). This initiative earned the institution the "Green Finance Pioneer of the Year" award, thereby reversing its negative image. In such cases, even if the initial intention is not green, positive environmental benefits may still be achieved.

These dual reputation mechanisms lead us to propose:
Hypothesis 2: Banks may issue green bonds to enhance ESG reputation or to recover from negative reputation.

(2) Financing Motives
When CCBs are faced with restricted funding channels, issuing green bonds can become an alternative funding option. Conventional bond market channels, such as the interbank bond market and exchanges, are not always convenient for CCBs. First, the credit ratings of CCBs are generally lower than those of large state-owned commercial banks (People's Bank of China, 2021), which limits their financing capacity in the bond market. Second, CCBs have relatively smaller asset sizes and business scopes (Sun et al., 2013), which subjects them to higher regulatory requirements and stricter review processes when issuing bonds.

In contrast, the Six Provinces and Nine Cities pilots provide several facilities for CCBs to issue green bonds. First, pilot policies encourage priority approval and fast-track procedures for green bonds, simplifying the issuance process for CCBs. Second, pilot policies are often accompanied by financial subsidies and tax incentives for green projects (Criscuolo and Menon, 2015), which reduce the cost of green bonds issuance (Wang and Wang, 2021). Additionally, policies offer preferential treatment and rewards to institutions that excel in green bond issuance and provide risk loss compensation, thereby reducing the risks associated with issuing green bonds. As a result, the convenience of green finance policies prompts CCBs to be more inclined to meet their financing needs through green bond issuance.

However, these facilities come with potential risks. First, CCBs may simply use them to address their own financing shortages, rather than genuinely committing to green projects. Second, in the early stages of China's green bond market, the lack of regulation regarding the use of proceeds could lead to "greenwashing" phenomena, where companies obtain financing through

green bonds by presenting false or exaggerated green projects.

This analysis of financing constraints and policy-induced incentives suggests:
Hypothesis 3: Banks with high financing needs might issue green bonds to alleviate their financing problems, driven by the convenience of issuance.

2.2.3. Governance Performance and Environmental Preferences of Local Governments

A principal-agent relationship exists between central and local governments. According to principal-agent theory, when the objectives of the principal (central government) and the agent (local government) diverge, an incentive misalignment problem arises (Jensen and Meckling, 1976). The central government's policy objectives encompass the dual tasks of economic growth and environmental protection; for local governments, their priorities are jointly influenced by regional development and the characteristics of officials.

From the regional development perspective, developed regions have already attained a relatively high level of economic development. Consequently, the environmental objectives of local officials align with the central government. Under China's government performance evaluation system (Gu et al., 2018), these local officials possess stronger incentives to advance green transitions through measures such as issuing green bonds. Conversely, less developed regions continue to face significant pressure to pursue economic growth. Local governments tend to prioritise resource allocation towards projects delivering short-term economic gains, thereby lacking sufficient motivation to advance environmental objectives (Zhang et al., 2011). From the perspective of local officials, the age of principal local leaders (such as municipal Party secretaries) serves as a key variable in gauging their promotion motivation. Younger officials, being in the ascendant phase of their careers, exhibit strong promotion motivation (Bai et al., 2025) and thus greater incentive to drive short-term GDP growth. As promotion motivation diminishes with age, older officials show reduced drive for economic growth and may instead prioritise long-term public services like environmental quality to shape their personal performance records (Wu et al., 2013).

These layered governmental motivations inform our final hypothesis:
Hypothesis 4: Local governments, driven by performance motives and green preferences, are more likely to enhance the intensity of green financial policies and promote the issuance of green bonds by CCBs.

3. Empirical Design

3.1. Regression Model

The baseline regression employs a Difference-in-Differences (DID) model to estimate the impact of policies in Six Provinces and Nine Cities pilot zones on the issuance of green bonds by CCBs. The model is specified as follows:

$$greenbond_{ict} = \alpha_0 + \alpha_1 \cdot policy_{c,t-1} + \mathbf{X\beta} + \gamma_i + \eta_c + \mu_t + \varepsilon_{ict}, \quad (1)$$

Where $greenbond_{ict}$ represents the green bond issuance status of bank *i* in city *c*, year *t*, including whether a green bond was issued (*issue*), cumulative issuance number (*acnumber*), and cumulative issuance value (ln*acvalue*). $policy_{c,t-1}$ is a dummy variable for whether a city has been designated as part of the Six Provinces and Nine Cities pilots. We take a one-year lag considering the lagged effect of policy impact. **X** represents a series of control variables, including bank-year level and city-year level controls. γ_i, η_c, and μ_t denote the fixed effects for banks, cities, and years, respectively, and ε_{ict} is the random error term.

3.2. Variables and Data Description

Given that China's green bond market was officially launched in 2015, this study employed panel data from 108 Chinese CCBs between 2015 and 2022 for analysis.[3] CCBs constitute both the primary beneficiaries of this policy pilot and the largest subgroup of Chinese commercial banks (representing 108 of the 241 banks).

The dependent variables include three green bond issuance status: (1) green bond issuance (*issue*), a dummy variable indicating whether the bank issued green bonds in a given year, taking the value 1 if issued, and 0 otherwise; (2) cumulative number of green bonds (*acnumber*), the total number of green bonds issued by a certain bank in the current and previous years; (3) cumulative value of green bonds (ln*acvalue*), the logarithm of green bonds volume issued by the bank in the current and previous years (USD 100 million). The data were sourced from the Bloomberg database.

The key independent variable is a policy dummy for the Six Provinces and Nine Cities, taking the value 1 if the bank is located in one of the pilot cities and the year is 2017 or later, and 0 otherwise.

A set of bank features that might influence the green bond issuance were controlled, including bank age (ln*age*), total assets (ln*totalasset*), asset-liability ratio (lnCAR), net interest margin (ln*interestmargin*), return on average assets (lnROAA), cost-income ratio (ln*costincome*), net loan ratio (ln*netloan*), and liquidity ratio (ln*liquidity*).[4] The bank-level data were sourced from the BvD Bank Focus database.

City-level socio-economy indicators were also controlled, covering log per capita GDP (ln*gdpp*, USD 100 million), financial development level (ln*finance*, USD 100 million), which is the logarithm of the year-end balance of deposits in financial institutions, and the proportion of the tertiary industry to GDP (*ter_industry*, %). The data were collected from China City Statistical Yearbooks.

[3] The dataset is maintained by the authors and will be provided upon reasonable request. It will also be made publicly accessible following the publication of the article.

[4] The explanation of these indicators is in Appendix A.

Additionally, three relevant policies were controlled. First, voluntary green financial policies (*voluntary*) implemented by cities other than the pilots were considered. The information was manually collected by looking through the relevant policy profiles. Cities of Dalian, Qingdao, and Xiamen have implemented such policies since 2015, 2016, and 2017, respectively. Second, dummies indicating the low carbon city pilots (LCC) and regional carbon emissions trading pilots (CET) were introduced. They take the value 1 for the pilot city and in the year of inclusion and thereafter, otherwise 0.

Descriptive statistics for these variables are presented in Table 1.

Table 1
Descriptive statistics

Variable	Variable definition	Obs.	mean	min	max
policy	Green financial policies	792	0.053	0	1
issue	Issuance of Green Bonds	792	0.088	0	1
acnumber	Cumulative Number of Green Bonds	792	0.524	0	7
ln*acvalue*	Cumulative Value of Green Bonds (log)	792	0.462	0	4.127
ln*age*	Bank's age (log)	792	2.832	0	3.611
ln*totalasset*	Bank's total assets (log)	789	5.700	3.413	8.525
lnCAR	Capital adequacy ratio (log)	789	1.982	1.206	3.107
ln*interestmargin*	Interest Margin (log)	781	0.693	-3.492	1.757
lnROAA	Return on Average Assets (log)	786	-0.527	-5.112	0.993
ln*costincome*	Cost-Income Ratio (log)	786	3.595	2.822	5.002
ln*netloan*	Net Loan Ratio (log)	786	3.783	2.376	4.245
ln*liquidity*	Liquidity Ratio (log)	785	2.699	0.243	5.206
ln*pgdp*	Real per capita GDP (log)	696	-9.137	-10.282	-8.033
ln*finance*	Financial Development Level (log)	703	6.983	4.549	10.30
ter_industry	Tertiary Industry Level	597	51.384	25.170	83.870
voluntary	Voluntary Green Financial Policies	792	0.034	0	1
LCC	Low-Carbon City Pilot Policy	792	0.326	0	1
CET	Carbon Emissions Trading Pilot Policy	792	0.136	0	1

4. Baseline Regression Results

4.1. Baseline Regression Results

The baseline regression results support hypothesis 1. Compared to non-pilot cities, green finance policies implemented under the Six Provinces and Nine Cities pilots have a significant positive effect on both the likelihood of CCBs in pilot cities issuing green bonds and their cumulative issuance volume and value (Table 2). First, the probability of CCBs issuing green bonds increases by 0.25 as a result of the pilot policy. However, this effect is less robust, as the coefficient is only significant at the 10% level when controlling for city-level fixed effects and clustering standard errors at the city level (column 2). Second, the pilot policy increases the

cumulative number of green bond issuances by 1.27 and nearly doubles the total issuance value. This effect is substantial and remains significant at the 1% level across different model specifications with varying fixed effects and clustering approaches (columns 1-4). In contrast, bank-level characteristics appear to play a limited role, as most coefficients of bank-level control variables are statistically insignificant.

Table 2

Baseline regression result.

	issue		*acnumber*		ln*acvalue*	
	(1)	(2)	(3)	(4)	(5)	(6)
l.*policy*	0.2546	0.2546*	1.2721***	1.2721***	0.9752***	0.9752***
	(1.60)	(1.76)	(6.87)	(5.75)	(4.48)	(3.61)
ln*age*	0.0149	0.0149	0.1475	0.1475	0.1874	0.1874
	(0.17)	(0.16)	(0.50)	(0.46)	(0.79)	(0.72)
ln*totalasset*	0.0705	0.0705	0.4060	0.4060	0.5238*	0.5238*
	(1.07)	(0.99)	(1.34)	(1.34)	(1.65)	(1.76)
lnCAR	-0.1122	-0.1122	-0.1499	-0.1499	0.0857	0.0857
	(-1.33)	(-1.13)	(-0.44)	(-0.53)	(0.31)	(0.31)
ln*interestmargin*	0.0852*	0.0852***	0.0581	0.0581	0.0563	0.0563
	(1.91)	(2.61)	(0.59)	(0.69)	(0.66)	(0.69)
lnROAA	-0.0261	-0.0261	0.0222	0.0222	0.0311	0.0311
	(-1.05)	(-1.26)	(0.29)	(0.28)	(0.49)	(0.42)
ln*costincome*	-0.0091	-0.0091	-0.2604	-0.2604	-0.2403	-0.2403
	(-0.17)	(-0.10)	(-1.07)	(-0.97)	(-1.07)	(-1.04)
ln*netloan*	-0.0201	-0.0201	0.2270	0.2270	0.2167	0.2167
	(-0.18)	(-0.23)	(0.65)	(0.66)	(0.75)	(0.72)
ln*liquidity*	-0.0126	-0.0126	0.0794	0.0794	0.1847**	0.1847**
	(-0.33)	(-0.34)	(0.74)	(0.89)	(2.06)	(2.24)
ln*pgdp*	0.0063	0.0063	0.4960	0.4960	0.3778	0.3778
	(0.07)	(0.07)	(1.18)	(1.20)	(1.18)	(1.17)
ln*finance*	-0.1457	-0.1457	-0.9863	-0.9863*	-0.8965*	-0.8965
	(-1.08)	(-0.84)	(-1.46)	(-1.66)	(-1.71)	(-1.60)
ter_industry	0.0061**	0.0061	0.0277	0.0277	0.0196	0.0196
	(2.43)	(1.64)	(1.39)	(1.25)	(1.31)	(1.18)
voluntary	0.0669	0.0669	0.6357	0.6357	0.1300	0.1300
	(0.97)	(0.98)	(0.67)	(0.60)	(0.22)	(0.19)
LCC	0.1247***	0.1247***	0.4010*	0.4010*	0.4406	0.4406*
	(2.91)	(2.94)	(1.73)	(1.65)	(1.90)	(1.79)
CET	-0.0465*	-0.0465	-0.8548**	-0.8548**	-0.6603**	-0.6603**
	(-1.93)	(-1.48)	(-2.05)	(-2.20)	(-2.33)	(-2.54)
Bank-FE	Y	Y	Y	Y	Y	Y
City-FE	N	Y	N	Y	N	Y
Year-FE	Y	Y	Y	Y	Y	Y
N	564	564	564	564	564	564
R^2	0.2662	0.2662	0.7627	0.7627	0.7651	0.7651

Notes: The t statistics are reported in the parentheses. ***, **, * represent significance levels of 1%, 5%, and 10% respectively. Standard errors are clustered at the city and year level in Columns (1), (3), and (5), and at the city level in Columns (2), (4), and (6).

4.2. Robustness Checks

4.2.1 Parallel Trend Test

The validity of our DID approach hinges on satisfying the parallel trends assumption, which requires that observed changes in CCBs' green bond issuance be attributable to green finance policies rather than pre-existing trends. To test this, we employed an event study methodology following the approach of Dang et al. (2023). The first sample year serves as the baseline reference point. Consistent with the baseline regression, we incorporated a one-year policy lag to ensure an adequate pre-treatment observation.

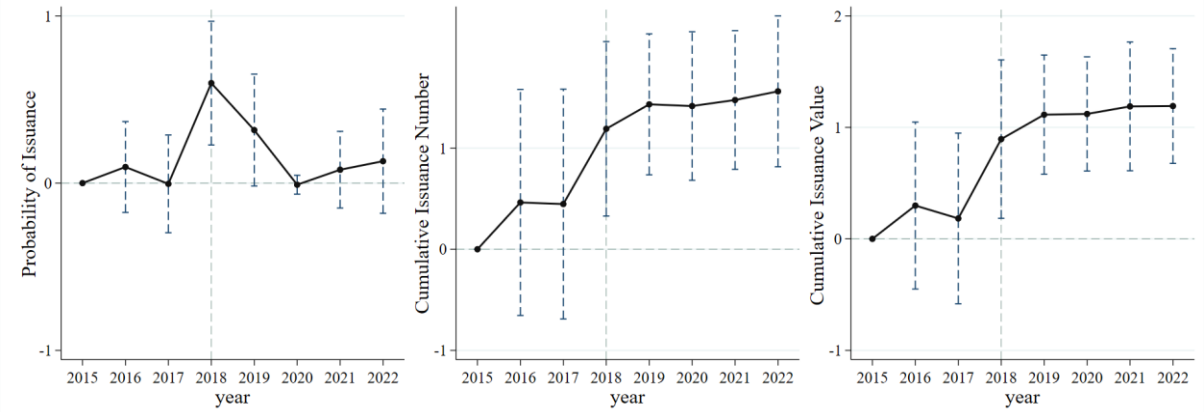


Fig. 3. Parallel trend test

The test results (Fig. 3) demonstrate that prior to green finance policy implementation, there is no significant pre-policy divergence in cumulative green bond issuance trends (both number and value) between treatment and control groups, thus satisfying the parallel trends assumption. Post-implementation, the coefficients of issuance probability show an immediate growth and soon become insignificant, while the coefficients become significantly positive and exhibit a sustained upward trajectory, evidencing both the policy impact on CCBs' green bond issuance and its progressive intensification over time.

4.2.2 Placebo Test

To rule out the influence of unobservable or random factors, we constructed "pseudo-policy dummy variables" for the Six Provinces and Nine Cities pilots by randomly assigning treatment and control groups. Specifically, we performed 500 random assignments to generate 500 estimated coefficients for the pseudo-policy dummies and plotted their kernel density distribution for comparison with the baseline regression coefficient. As shown in Figure 4, the pseudo-regression coefficients are all centred around zero and exhibit a normal distribution, while the actual regression coefficient (represented by the dashed line) lies well outside the distribution range of the pseudo coefficients. This finding suggests that the observed effect of green financial policies on CCBs' green bond issuance is not attributable to random variation, thereby reinforcing the authenticity and robustness of the policy impact.

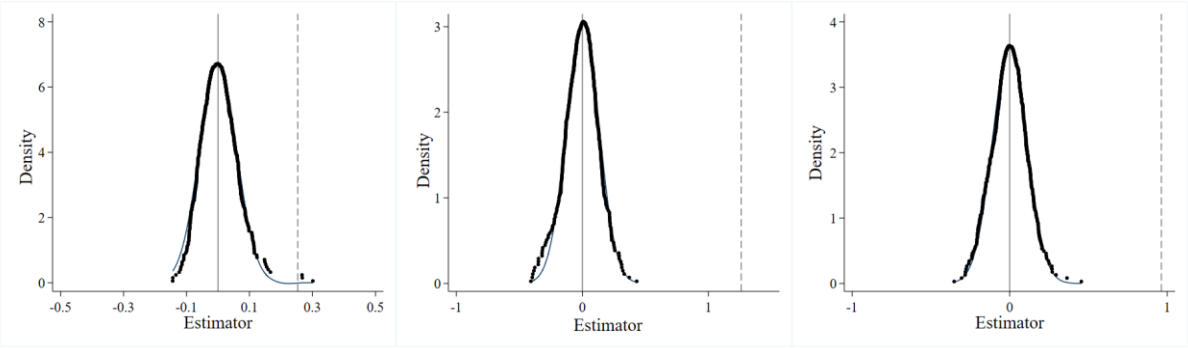


Fig. 4. Placebo test for probability of issuance, cumulative issuance number and cumulative issuance value

4.2.3. Controlling for Pre-Policy Characteristics of Cities

Given that the allocation of green finance pilot policies may be influenced by the initial characteristics of cities, we included interaction terms between cities' pre-policy characteristics and year dummies as control variables. We examined two dimensions of these characteristics: carbon intensity and financial development in the year prior to policy implementation (i.e. 2016). The former is measured as CO_2 emissions per unit of GDP, and the latter is the logarithm of the total loan balance of financial institutions. The estimated coefficients remain consistent with the baseline results after accounting for these confounding factors (Table 3 Panel A)

4.2.4. PSM-DID

To further address potential selection bias of pilot cities, we adopted the propensity score matching (PSM) method (Heckman, 1998) before DID regression. This approach constructed a new control group of CCBs matched on propensity scores derived from bank-level covariates. Specifically, we estimated propensity scores using a logit model based on selected bank characteristics. We then applied nearest neighbour matching with a caliper of 0.0001 and a 1:4 ratio (k=1). A DID estimation is subsequently conducted on the matched sample. The regression results (Table 3, Panel B, Column 1-3) indicate that except for the coefficients of issuance probability, other estimated coefficients are slightly larger, but still consistent with those from the baseline regression.

4.2.5. Alternative Dataset for Green Bond

In addition to the Bloomberg database, we utilised data from CSMAR's China Bond Basic Information Research Database as a supplementary source. This database records detailed issuance information for over 339,130 bonds, including both green bonds and conventional bonds, listed on the Shanghai Stock Exchange, Shenzhen Stock Exchange, and the national interbank market in China. From this dataset, we identified 213 green bonds issued by banks and matched the names of issuing institutions with the 108 banks analysed in this study.

Based on this, we further re-estimated the baseline regression (Table 3, Panel B, Column 4-6).

The regression coefficients derived from the CSMAR data closely align with the baseline results, thereby further supporting the robustness of the study's main findings.

Table 3

Robustness checks

	(1) *issue*	(2) *acnumber*	(3) ln*acvolume*	(4) *issue*	(5) *acnumber*	(6) ln*acvalue*
Panel A	Controlling for Pre-Policy Characteristics of Cities					
l.policy	0.2652*	1.3299***	1.0589***	0.2606*	1.2788***	1.0082***
	(1.75)	(5.25)	(3.94)	(1.78)	(5.58)	(4.10)
*CO2 Int.*Year*	Y	Y	Y	N	N	N
*FD*Year*	N	N	N	Y	Y	Y
N	564	564	564	561	561	561
R^2	0.2679	0.7660	0.7745	0.2690	0.7627	0.7727
Panel B	PSM-DID			Alternative Dataset		
l.policy	0.2176	1.1716***	0.9030**	0.2550*	1.2680***	1.0028***
	(0.98)	(4.06)	(2.26)	(1.76)	(5.79)	(3.73)
N	122	122	122	564	564	564
R^2	0.4479	0.9269	0.9183	0.2647	0.7613	0.7641
Panel C	Nearest neighbour matching			Nearest neighbour matching+PSM		
l.policy	0.5602**	1.1150***	0.8772***	0.1991	1.1022***	0.6342**
	(2.45)	(4.41)	(2.98)	(1.35)	(4.67)	(2.07)
N	56	56	56	147	147	147
R^2	0.6481	0.9178	0.9210	0.4283	0.9040	0.8929
Panel D	Excluding Confounding Events			Adding Time Trend		
l.policy	0.2499*	1.3004***	0.9946***	0.2546*	1.2721***	0.9752***
	(1.71)	(5.57)	(4.03)	(1.76)	(5.75)	(3.61)
TFIPP	0.0297	0.0108	0.0975			
	(0.68)	(0.03)	(0.41)			
EPTL	0.0075	0.1998	0.2517			
	(0.19)	(1.00)	(1.44)			
Time Trend	N	N	N	Y	Y	Y
N	564	564	564	564	564	564
R^2	0.2664	0.7646	0.7695	0.2662	0.7627	0.7651
Control	Y	Y	Y	Y	Y	Y
Bank-FE	Y	Y	Y	Y	Y	Y
City-FE	Y	Y	Y	Y	Y	Y
Year-FE	Y	Y	Y	Y	Y	Y

Notes: The t statistics are reported in the parentheses. ***, **, * represent significance levels of 1%, 5%, and 10%, respectively. Standard errors are clustered at the city level.

4.2.6. Nearest neighbour matching

We employ geographical proximity matching to mitigate selection bias. Given that the selection of pilot cities is typically associated with regional characteristics, we construct a control group comprising non-pilot cities adjacent to each pilot city and re-estimate using the DID model (Table 3, Panel C, Column 1-3).

Building upon this, we further incorporated cities selected through propensity score matching alongside their neighbouring cities as the control group, and conducted a repeat DID estimation (Table 3, Panel C, Columns 4-6). The regression results align with those of the baseline

regression.

4.2.7. Excluding Confounding Events

To rule out the potential influence of confounding events on our findings, we excluded the effects of two relevant policies. One is the "Technology-Finance Integration Pilot Programme" (TFIPP),[5] launched in October 2011. It was initially implemented in 16 regions, with a second phase introduced in nine cities in June 2016. The other is the *Environmental Protection Tax Law of the People's Republic of China* (EPTL), which came into effect on 1 January 2018. We added two dummies indicating these policies into the regression model.

The estimated coefficients of our key policy dummy remain consistent with the baseline results (Table 3, Panel D, Column 1-3). Moreover, the coefficients of these two relevant policies are statistically insignificant. This implies that they are not the main drivers of green bond issuance by CCBs, nor do they confound the estimated policy effects of Six Provinces and Nice Cities pilots.

4.2.8. Adding Time Trend

Adding a time trend term may exclude the autonomous increasing trend of green bond issuance. The regression results (Table 3, Panel D, Column 4-6) also remain consistent with the baseline, further reinforcing the credibility of our empirical findings.

5. Analysis of Motivations and Preferences for Banks and Governments

This paper further investigates the underlying motivations of both bond-issuing banks and local governments. For CCBs, the issuance of green bonds may be driven either by the pursuit of procedural convenience and expanded financing channels, or by the intention to enhance their ESG performance to cultivate a more favourable image among investors. While the latter is more likely to contribute to substantive improvements in green performance, the former raises concerns about potential greenwashing. On the part of local governments, the intensity of policy implementation is often shaped by government preferences, whether environmentally motivated or influenced by promotion-related incentives. These preferences can amplify the actual strength of pilot programmes, thereby reinforcing the policy-driven nature of green bond issuance.

5.1. Bank Level

5.1.1. Reputational Motivation

As mentioned in hypothesis 2, by issuing green bonds, banks can establish a positive ESG profile or counteract the negative effects of prior adverse events, such as administrative

[5] The pilot programme was jointly launched by the Ministry of Science and Technology, the PBoC, and three other central government agencies.

penalties. Here we construct two dummy variables accordingly: (1) *ESG*, which equals 1 if the bank had an ESG rating that year, and 0 otherwise. To address the potential endogeneity between a bank's ESG rating and its green bond issuance, we lagged the ESG rating variable by one year; (2) *adm*, which equals 1 if a bank was investigated or penalised by regulatory authorities in a given year, and 0 otherwise. We interacted these variables with green finance policy indicators to examine how ESG images or administrative penalties influence banks' green bond issuance behaviour.

Our findings raise concerns about potential greenwashing in the reputational motivations behind CCBs' green bond issuance. First, banks' green preferences, measured by ESG ratings, do not significantly affect the probability, cumulative number, or value of green bonds issued (Table 4, columns 1-3). This result contradicts the first part of hypothesis 2 and suggests that non-green motivations, rather than genuine green preferences, are the primary drivers. Second, CCBs with administrative penalties are more likely to issue green bonds, increasing the probability of issuance but not the cumulative number or value (columns 4-6), partially supporting the second part of hypothesis 2. This pattern may reflect a form of window-dressing behaviour, where banks seek to offset negative reputational effects through isolated issuance events, without contributing to the substantive growth of the green bond market.

Table 4
Reputational Motivation of CCBs

	ESG			Penalties		
	(1)	(2)	(3)	(4)	(5)	(6)
	issue	*acnumber*	lnac*volume*	*issue*	*acnumber*	lnac*volume*
*l.policy*l.ESG*	0.3056	0.6736	0.3468			
	(1.23)	(1.43)	(0.62)			
*l.policy*adm*				0.7162***	-0.3498**	-0.4903***
				(12.14)	(-2.24)	(-3.24)
l.policy	0.1549	0.8348**	0.7607*	0.3111***	1.2675***	1.0628***
	(0.59)	(2.11)	(1.99)	(3.39)	(4.60)	(3.65)
Control	Y	Y	Y	Y	Y	Y
Bank-FE	Y	Y	Y	Y	Y	Y
City-FE	Y	Y	Y	Y	Y	Y
Year-FE	Y	Y	Y	Y	Y	Y
N	467	467	467	527	527	527
R^2	0.2872	0.8458	0.8339	0.3100	0.7530	0.7635

Notes: The t statistics are reported in the parentheses. ***, **, *, ° represent significance levels of 1%, 5%, 10%, and 15% respectively. Standard errors are clustered at the city level. The level terms of *l.ESG* and *adm* are controlled.

5.1.2. Financing Motivation

As assumed in hypothesis 3, when traditional financing avenues, such as conventional bonds issuance, are constrained, green bonds emerge as a key alternative for meeting the capital needs of CCBs, particularly when supported by green finance policies. To investigate this mechanism, we first introduced the interaction term of policy and loan provision rate as an indicator for financing need of CCBs. A higher rate reflects elevated credit risk, requiring greater reserves and therefore increasing the bank's financing demand. We then incorporated the volume and

average interest rate of non-green bonds issued by each bank over the preceding two years to capture their ability to alleviate financial constraints through the conventional bond market.

Our findings support the view that CCBs are motivated to use green bonds as a financing tool. First, we find that banks with greater funding needs are more likely to issue a larger quantity and higher total value of green bonds (Table 5, columns 1-3). Furthermore, why do CCBs choose green bonds over conventional bonds to alleviate funding pressures? One plausible explanation is the relatively low returns from conventional bonds. We observe that banks which issued conventional bonds at lower interest rates over the preceding two years are more likely to increase the number of green bond issuances (Table 5, column 5). However, conventional bond issuance does not significantly affect either the probability or the total value of green bonds issued (columns 4 and 6). This may reflect CCBs' limited capacity to issue green bonds of larger value. Overall, the results confirm that green bond issuance serves as a strategic response by CCBs to mitigate financing constraints, consistent with hypothesis 3.

Table 5
Financing Motivation of CCBs

	Financing Need			Constrained Capability in Conventional Bond Markets		
	(1)	(2)	(3)	(4)	(5)	(6)
	issue	*acnumber*	ln*acavalue*	*issue*	*acnumber*	ln*acavalue*
*l.policy*loanprovision*	0.2921**	0.5692***	0.5623***			
	(2.32)	(3.27)	(3.77)			
*l.policy*past_intrrate*				-0.0231	-0.1082**	-0.0604
				(-0.34)	(-2.09)	(-0.95)
l.policy	-0.7735*	-0.7180	-0.8701*	0.2774	1.1883***	0.9495**
	(-1.72)	(-1.07)	(-1.69)	(1.11)	(3.12)	(2.34)
Control	Y	Y	Y	Y	Y	Y
Bank-FE	Y	Y	Y	Y	Y	Y
City-FE	Y	Y	Y	Y	Y	Y
Year-FE	Y	Y	Y	Y	Y	Y
N	521	521	521	467	467	467
R^2	0.2687	0.7762	0.7782	0.2848	0.8456	0.8339

Notes: The t statistics are reported in the parentheses. ***, **, *, ° represent significance levels of 1%, 5%, 10%, and 15% respectively. Standard errors are clustered at the city level. Level term of *loanprovision* and *past_intrrate* have been controlled.

5.2. Government Level: Green Preferences and Performance Motivations

5.2.1. Performance Motivation of Local Officials

The effectiveness of local governments in implementing green finance policies is closely tied to the performance motivations of local governments, which are, in part, influenced by the age and location of officials. To test the influence of officials' performance incentives, we included two key variables; (1) the age of the municipal party secretary (*secretary_age*), who is the highest-ranking official in the city's administrative hierarchy, and (2) whether the city is economically developed (*dep*). We then introduced a triple interaction term combining these variables with the green finance policy dummy to examine how these factors jointly influence policy implementation effectiveness.

The regression results (Table 6, Panel A, column 1-3) show that younger party secretaries in less developed cities and older secretaries in developed cities, both covered by pilot policies, are more strongly motivated to promote green finance, albeit for different reasons. Younger secretaries in less developed regions tend to be more promotion-oriented (Qi et al., 2024). While they must prioritise economic development, they seek to build a track record in green finance. As a result, CCBs in these areas exhibit a higher probability of issuing green bonds (negative coefficient of *l.policy*secretary_age*), but with no significant growth in cumulative issuance number or value. In contrast, older secretaries in more developed cities are generally less constrained by economic development goals and place greater emphasis on environmental governance (Wright, 2008). Consequently, CCBs in their jurisdictions demonstrate a more comprehensive promotion of green bond issuance, reflected in increases not only in issuance probability but also in the number and value of green bonds issued (positive coefficients of *l.policy*secretary_age*dep*).

We compared the age distribution characteristics of municipal Party secretaries in pilot and non-pilot cities. Data revealed that the average age of municipal Party secretaries in pilot cities was 52.6 years, while that in non-pilot cities was 53.7 years, representing a difference of 1.1 years. The results of t-test indicated that the age difference was not statistically significant (t = 1.22, p = 0.224), thereby ruling out the possibility that age disparities influenced the findings.

Table 6

Motivations of Local Governments

	(1) *issue*	(2) *acnumber*	(3) ln*acvalue*	(4) *issue*	(5) *acnumber*	(6) ln*acvalue*
Panel A Performance Motivation of Local Officials						
*l.policy*secretary_age*dep*	0.1574***	0.2396**	0.2740***			
	(3.48)	(2.46)	(2.88)			
*l.policy*secretary_age*	-0.2816***	-0.0934	-0.0656			
	(-12.29)	(-1.12)	(-0.91)			
*l.policy*other_policy*				-0.0518	-0.4974*	0.1798
				(-0.25)	(-1.68)	(0.38)
l.policy	16.2143***	7.1246º	4.0185	0.2825***	1.6033***	0.8025**
	(12.52)	(1.52)	(1.01)	(6.38)	(6.91)	(1.99)
N	542	542	542	564	564	564
R^2	0.3168	0.7688	0.7715	0.2669	0.7638	0.7678
Panel B Green Preferences of Local Governments						
*l.policy*frequency*	0.9313**	1.2992º	0.5849			
	(2.23)	(1.64)	(0.90)			
*l.policy*penalty cases*				0.0837***	-0.0971*	-0.0407
				(3.64)	(-1.91)	(-0.97)
l.policy	-0.0530	0.8031**	0.8531***	-0.2378	1.8418***	1.2439***
	(-0.30)	(2.00)	(3.19)	(-1.01)	(6.75)	(2.76)
N	560	560	560	561	561	561
R^2	0.2738	0.7637	0.7662	0.2815	0.7644	0.7660
Control	Y	Y	Y	Y	Y	Y
Bank-FE	Y	Y	Y	Y	Y	Y
City-FE	Y	Y	Y	Y	Y	Y
Year-FE	Y	Y	Y	Y	Y	Y

Notes: The t statistics are reported in the parentheses. ***, **, *, ° represent significance levels of 1%, 5%, 10%, and 15% respectively. Standard errors are clustered at the city level. For models in column 1-3, Panel A, cross terms of *l.policy*secretary_age*, *l.policy*dep*, *secretary_age*dep*, and level terms of *l.policy, secretary_age, dep* have all been controlled. For other models with interaction terms, all the level terms have been controlled.

Performance motivation must also consider the overlapping effects of existing policies. If a local government has previously participated in, or is concurrently implementing, other green or financial pilot initiatives, it has less motivation to demonstrate policy performance in the green finance pilot programme. We thus introduced a dummy (*other-policy*) that indicating whether a city is simultaneously involved in other relevant pilot programmes, namely the Technology and Finance Integration Policy, the Low-Carbon Pilot Policy, and the Carbon Emissions Trading Policy.

The results (Table 6, Panel A, column 4-6) show that cities participating in both the green finance pilot and other green or financial pilots display weaker policy implementation intensity compared to those implementing only the green finance pilot. This finding supports part of hypothesis 4, suggesting that local governments with fewer pilot opportunities are more motivated by performance incentives to intensify the implementation of the green finance policy.

5.2.2. Green Preference of Local Governments

As discussed in hypothesis 4, the effectiveness of green finance policies under the Six Provinces and Nine Cities pilots may also be enhanced in cities that demonstrate a stronger green preference. To examine this hypothesis, we measured the green preference of local governments through two dimensions: environmental concern and the intensity of environmental law enforcement. First, to capture environmental concern, we analysed the frequency of environment-related terms relative to the total word count in municipal government work reports. Second, to measure the intensity of environmental enforcement, we used the number of environmental penalty cases at the provincial level as a proxy. These indicators are interacted with the green finance policy variable.

The results, presented in Table 6 (Panel B), indicate that higher levels of environmental concern and stricter enforcement of environmental regulations are associated with an increased probability of green bond issuance by CCBs, but do not significantly affect the cumulative number or value of green bonds issued. This suggests that CCBs may engage in occasional issuance events that cater to the green preferences or political pressure from local governments, rather than demonstrating sustained commitment. These findings further reinforce concerns about potential greenwashing behaviours among CCBs.

5.3. Does the Pilot Policy Motivate CCBs to Issue Genuine Green Bonds?

To assess whether the policy meaningfully stimulated the issuance of genuine green bonds, this paper further examines whether the probability, cumulative number, and cumulative value of

bond issuances, where proceeds are explicitly allocated to green projects, have significantly increased among CCB-issued green bonds.

We identified genuine green bonds within the broader sample by screening based on the verified use of proceeds and retained only those meeting substantive green criteria. We then aggregated these bonds at the issuing-bank level and recalculated the three dependent variables.

The results show that, although the probability of annual issuance and the cumulative number of genuine green bonds have increased, the cumulative issuance value has not. Moreover, the estimated coefficients for all three variables are lower than those obtained from regressions using the full green bond sample. This indicates that CCBs lack sufficient motivation to issue genuine green bonds even under strong policy incentives. While policy-driven capital allocation has not been explicitly directed towards green sectors, bond issuance has grown more strongly in these areas overall, according to the benchmark regression results. This pattern partially corroborates earlier concerns regarding potential greenwashing by both commercial banks and local governments.

Table 7

Motivations of Greenwashing

	(1) *issue*	(2) *acnumber*	(3) ln*acvalue*
l.policy	0.1619***	0.4397**	0.4416
	(2.65)	(2.07)	(1.29)
Control	Y	Y	Y
Bank-FE	Y	Y	Y
City-FE	Y	Y	Y
Year-FE	Y	Y	Y
N	564	564	564
R^2	0.2786	0.7075	0.7284

Notes: The t statistics are reported in the parentheses. ***, **, * represent significance levels of 1%, 5%, and 10% respectively. Standard errors are clustered at the city level.

6. Conclusion

Existing research has largely focused on banks as underwriters of green bonds, with limited attention paid to the motivations driving banks themselves to issue such bonds. To address this gap, this study investigates the factors influencing Chinese CCBs' decisions to issue green bonds, considering the roles of policy incentives, institutional characteristics, and local government dynamics.

The findings reveal four main insights. First, at the policy level, the green finance pilot zones significantly increase the likelihood, number, and value of green bonds issued by CCBs. Second, from the perspective of the bond-issuing entities, non-green motivations such as financing needs and reputational considerations are key drivers: banks with higher financing needs and constraints are more inclined to issue green bonds for financing purposes, while those with administrative penalties are more likely to do so to repair their green image. Third,

performance motivations of local officials are positively associated with increased green bond issuance. Similarly, cities that focus solely on green finance policies exhibit greater policy execution effectiveness to earn a track record. Finally, green motivation at the bank level is not a primary driving factor, and green preferences at the government level appear to induce only occasional and symbolic issuances by CCBs, raising concerns over potential greenwashing.

This study not only affirms the efficacy of local green finance policies in promoting green financial development but also underscores the substantial influence of local governments' environmental orientation on the green financing behaviour of CCBs. Importantly, it provides new empirical evidence on the motivations of CCBs as active participants in the green bond market in China. For the green economy to achieve sustained progress, localities require not only a coherent and comprehensive policy environment, but also close collaboration between local governments and financial institutions. Policymakers should consider tailoring green finance initiatives to leverage the performance incentives of local officials and provide targeted support to regions with fewer pilot opportunities but stronger policy implementation potential. Given the prevalence of non-green motivations and sparse issuance patterns driven by reputational concerns or government pressure, the risk of greenwashing remains a concern that needs to be addressed to ensure the integrity of green financial development.

References

Anh Tu, C., Sarker, T., Rasoulinezhad, E., 2020. Factors Influencing the Green Bond Market Expansion: Evidence from a Multi-Dimensional Analysis. J. Risk Financ. Manag. 13(6), 126. https://doi.org/10.3390/jrfm13060126.

Bai, Z., Zhang, P., Yi, H., 2025. Political career incentives and multitasking trade-off: Evidence from setting performance targets in Chinese cities. China Econ. Rev. 94, 102537. https://doi.org/10.1016/j.chieco.2025.102537.

Campiglio, E., 2016. Beyond carbon pricing: the role of banking and monetary policy in financing the transition to a low-carbon economy. Ecol. Econ. 121, 220–230. https://doi.org/10.1016/j.ecolecon.2015.03.020.

Cao, X., Cheng, J., Ma, W., 2021. Motivation of Chinese commercial banks to issue green bonds: financing costs or regulatory arbitrage?. China Econ. Rev. 66, 101582. https://doi.org/10.1016/j.chieco.2020.101582.

Chen, Y., Cheng, L., Lee, C.C., Wang, C.S., 2021. The impact of regional banks on environmental pollution: evidence from China's City commercial banks. Energy Econ. 102, 1–15. https://doi.org/10.1016/j.eneco.2021.105492.

China Banking and Insurance Regulatory Commission (CBIRC), 2019. Notice on Typical Cases of Inadequate Implementation of Small and Micro Enterprise Financial Support Policies by Some Banks. http://credit.shaanxi.gov.cn/316.news.detail.dhtml?news_id=7727538.

China Central Depository & Clearing Co., Ltd. (CCDC), 2024. China Green Bond White Paper. P020241021333948039271.pdf.

Criscuolo, C., Menon, C., 2015. Environmental policies and risk finance in the green sector: cross-country evidence. Energy Pol. 83, 38–56. https://doi.org/10.1016/j.enpol.2015.03.023.

Dang, V.A., Gao, N., Yu, T., 2023. Climate policy risk and corporate financial decisions: Evidence from

the NOx budget trading program. Manag. Sci. 69 (12), 7517–7539. https://doi.org/10.1287/mnsc.2022.4617.

Ehlers, T., Packer, F., 2017. Green bond finance and certification. BIS Q. Rev. September, 89-104. https://www.bis.org/publ/qtrpdf/r_qt1709h.htm.

Fang L. H., 2005. Investment bank reputation and the price and quality of underwriting services. J Finance. 60(6):2729–2761. https://doi.org/10.1111/j.1540-6261.2005.00815.x.

Fatica, S., Panzica, R., Rancan, M., 2021. The pricing of green bonds: Are financial institutions special? J. Financ. Stab. 54, 100873. https://doi.org/10.1016/j.jfs.2021.100873.

Feldhütter, P., Halskov, K., Krebbers, A., 2024. Pricing of sustainability-linked bonds. J. Financ. Econ. https://doi.org/10.1016/j.jfineco.2024.103944.

Ferri, G., 2009. Are new tigers supplanting old mammoths in China's banking system? Evidence from a sample of city commercial banks. J. Bank Financ. 33, 131 – 140. https://doi.org/10.1016/j.jbankfin.2007.06.013.

Financial sector, 2022. Ping An Bank successfully issues its first green bond. https://baijiahao.baidu.com/s?id=1749099501378833393&wfr=spider&for=pc.

Flammer, C., 2021. Corporate green bonds. J. Financ. Econ. 142 (2), 499–516. https://doi.org/10.1016/j.jfineco.2021.01.010.

Geng, Y., Doberstein, B., 2008. Greening government procurement in developing countries: building capacity in China. J. Environ. Manag. 88, 932–938. https://doi.org/10.1016/j.jenvman.2007.04.016.

Goffman, E., 1959. The presentation of self in everyday life. Garden City. https://www.taylorfrancis.com/chapters/edit/10.4324/9781003320609-59/presentation-self-everyday-life-erving-goffman.

Gu, A., Teng, F., Feng, X., 2018. Effects of pollution control measures on carbon emission reduction in China: evidence from the 11th and 12th Five-Year Plans. Clim. Policy. 18, 198–209. https://doi.org/10.1080/14693062.2016.1258629.

Heckman, J.J., Ichimura, H., Todd, P., 1998. Matching as an econometric evaluation estimator. Rev. Econ. Studies 65 (2), 261–294. https://doi.org/10.1111/1467-937X.00044.

Heinkel R, Kraus A, Zechner J., 2001. The effect of green investment on corporate behavior. J. Financ. Quant. Anal. 36(4), 431–449. https://doi.org/10.2307/2676219.

International Energy Agency (IEA), 2024. World Energy Investment 2024. https://iea.blob.core.windows.net/assets/b7f43616-e90d-4314-be5e-47f66a89a4b0/WorldEnergyInvestment2024.pdf.

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behavior: agency costs and owership structure. J. Financ. Econ. 3 (4), 305-360. https://doi.org/10.1016/0304-405X(76)90026-X.

Laufer, W. S., 2003. Social accountability and corporate greenwashing. J. Bus. Ethics. 43, 253-261. https://doi.org/10.1023/A:1022962719299.

Liu, S., Qi, H., Wan, Y., 2022. Driving factors behind the development of China's green bond market. J. Clean. Prod. 354, 131705. https://doi.org/10.1016/j.jclepro.2022.131705.

MacAskill, S., Roca, E., Liu, B., Stewart, R. A., Sahin, O., 2021. Is there a green premium in the green bond market? Systematic literature review revealing premium determinants. J. Clean. Prod. 280, 124491. https://doi.org/10.1016/j.jclepro.2020.124491.

Mertzanis, C., 2023. Energy policy diversity and green bond issuance around the world. Energy Econ. 128, 107116. https://doi.org/10.1016/j.eneco.2023.107116.

National Development and Reform Commission (NDRC), 2015. Guidelines for Green Bond Issuance.

https://zfxxgk.ndrc.gov.cn/web/iteminfo.jsp?id=2363.
National Development and Reform Commission, China (NDRC), 2024. Guidelines for Green Bond Issuance.
People's Bank of China (PBoC), National Development and Reform Commission (NDRC), China Securities Regulatory Commission (CSRC), 2021. Catalogue of Green Bond Supported Projects (2021 Edition). https://www.gov.cn/zhengce/zhengceku/2021-04/22/content_5601284.htm.
People's Bank of China (PBoC), the Ministry of Finance, and seven other agencies, 2016. Guiding Opinions on Building a Green Financial System. https://www.mee.gov.cn/gkml/hbb/gwy/201611/t20161124_368163.htm.
People's Bank of China (PBoC), 2021. China Financial Stability Report 2021. http://www.pbc.gov.cn/en/3688235/3688414/3710021/4387489/4387862/2021111218122982083.pdf.
Pineiro-Chousa, J., Lopez-Cabarcos, M.A., Caby, J., Sevic, A., 2021. The influence of investor sentiment on the green bond market. Technol. Forecast. Soc. Chang. 162, 120351. https://doi.org/10.1016/j.techfore.2020.120351.
Qi, Y., Yin, A., Chen, J., Yang, C., Zhan, P., 2024. Motivating for environmental protection: evidence from county officials in China. World Dev. 184, 106760. https://doi.org/10.1016/j.worlddev.2024.106760.
Qian, X., Zhang, G., Liu, H., 2015. Officials on boards and the prudential behavior of banks: evidence from China's city commercial banks. China Econ. Rev. 32, 84–96. https://doi.org/10.1016/j.chieco.2014.11.010.
Sachs, J.D., Woo, W.T., Yoshino, N., Taghizadeh-Hesary, F., 2019. Importance of green finance for achieving sustainable development goals and energy security. Handb. Green Finance: Energy Secur. Sustain. Dev. 10, 1–10. https://doi.org/10.1007/978-981-13-0227-5_13.
Sadorsky P., 2012. Modeling renewable energy company risk. Energy Pol. 40, 39–48. https://doi.org/10.1016/j.enpol.2010.06.064.
Sun, J.J., 2013. Regional economic development, strategic investors, and efficiency of Chinese city commercial banks. J. Bank Financ. 37, 1602–1611. https://doi.org/10.1016/j.jbankfin.2012.12.013.
Sun, J., Harimaya, K., Yamori, N., 2013. Regional economic development, strategic investors, and efficiency of Chinese city commercial banks. J. Bank Financ. 37, 1602–1611. https://doi.org/10.1016/j.jbankfin.2012.12.013.
Tan, X., Dong, H., Liu, Y., Su, X., Li, Z., 2022. Green bonds and corporate performance: a potential way to achieve green recovery. Renew. Energy. 200, 59–68. https://doi.org/10.1016/j.renene.2022.09.109.
Tolliver, C., Keeley, A.R., Managi, S., 2020. Drivers of green bond market growth: the importance of Nationally Determined Contributions to the Paris Agreement and implications for sustainability. J. Clean. Prod. 244, 118643. https://doi.org/10.1016/j.jclepro.2019.118643.
Wang, X.Y., Wang, Q., 2021. Research on the impact of green finance on the upgrading of China's regional industrial structure from the perspective of sustainable development. Resour. Pol. 74, 102436. https://doi.org/10.1016/j.resourpol.2021.102436.
Wright, J., 2008. To invest or insure? How authoritarian time horizons impact foreign aid effectiveness. Comp. Polit. Stud. 41 (7), 971–1000. https://doi.org/10.1177/0010414007308538.
Wu, J., Deng, Y., Huang, J., Morck, R., Yeung, B., 2013. Incentives and outcomes: China's environmental policy. (National Bureau of Economic Research Working Paper No. 18754).

http://www.nber.org/papers/w18754.
Yeow, K. E., Ng, S.-H., 2021. The Impact of Green Bonds on Corporate Environmental and Financial Performance. Manag. Financ. 47, 1486–1510. https://doi.org/10.1108/MF-09-2020-0481.
Zhang, B., Yang, Y., Bi, J., 2011. Tracking the implementation of green credit policy in China, top-down perspective and bottom-up reform. J. Environ. Manag. 92 (4), 1321–1327. https://doi.org/10.1016/j.jenvman.2010.12.019.
Zhang, W., Ke, J., Ding, Y., Chen, S., 2024. Greening through finance: Green finance policies and firms' green investment. Energy Econ. 131, 107401. https://doi.org/10.1016/j.eneco.2024.107401.

Appendix

A. Explanation of bank-level indicators

1. Bank age (ln*age*), the logarithm of the bank's age.
2. Bank size (ln*totalasset*), the logarithm of the bank's total assets (USD 100 million).
3. Asset-liability ratio (lnCAR), the logarithm of the capital adequacy ratio (%), measuring the bank's risk-bearing capacity.
4. Operational performance indicators includes: net interest margin (lninterestmargin), the logarithm of the ratio of net interest income to total interest-earning assets (%); return on average assets (lnROAA), the logarithm of the average return on assets, measuring the bank's profitability; and cost-income ratio (ln*costincome*), the logarithm of the cost-income ratio (%).
5. Liquidity indicators includes net loan ratio (ln*netloan*), which is the logarithm of the ratio of net loans to total assets (%), and the liquidity ratio (ln*liquidity*), which is the logarithm of the ratio of liquid assets to deposits and short-term financing (%).