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CHINA'S GREEN BOND MARKET: AN IN-DEPTH ANALYSIS OF ISSUER PERSPECTIVES

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Abstract: China's green bond market has seen significant development since its inception, albeit starting later than its international counterparts. This growth has been driven by regulatory initiatives and industry standards aimed at promoting green finance and sustainability. In 2014, the Global Capital and Market Federation, along with the Meteorological Securities Development Group, established the Basic Principles of Green Securities (GBP) and the Guidelines for Meteorological Securities Institutions (CBS), providing essential groundwork for industry regulation. In 2015, the Chinese government issued "Several Opinions on Further Promoting the Construction of Socialist Ecological Civilization," marking the initial steps towards establishing a green financial system within China. Subsequently, continuous government support and regulatory measures have paved the way for the blossoming of the green bond market.

A significant milestone was reached in July 2022 when China introduced its Green Bond Principles, marking a new phase of development for the market. To gain insights into the current state and challenges of China's green bond market, this study reviews literature and professional reports from 2015 to 2022. It offers a comprehensive overview of the market's progress, identifies existing challenges, and presents strategic recommendations for further development.

Keywords: Green bonds, China, sustainable finance, regulatory initiatives, green finance, sustainability, financial market, environmental standards.

Introduction

Compared with the international market, the development of green bonds in China started late. From 2008 to 2014, global green securities began to be issued by international financial services groups, EU foreign investment banks and other entities, and in 2014, the Global Capital and Market Federation and the Meteorological Securities Development Group promulgated the Basic Principles of Green Securities (GBP) and the Guidelines for Meteorological Securities Institutions (CBS), marking the formal establishment of industry rules. In 2015, the State Council issued "Several Opinions on Further Promoting the Construction of Socialist Ecological Civilization" for the first time, marking the first formal exploration of the green financial system in China, and then continuously promoted by the government. In July 2022, China's Green Bond Principles were promulgated,

marking another milestone in the green bond market. In order to explore the current situation and problems of China's green bond market, we consulted the literature and professional reports from 2015 to 2022, summarized the current situation, analyzed the problems and put forward suggestions.

1. Literature Review

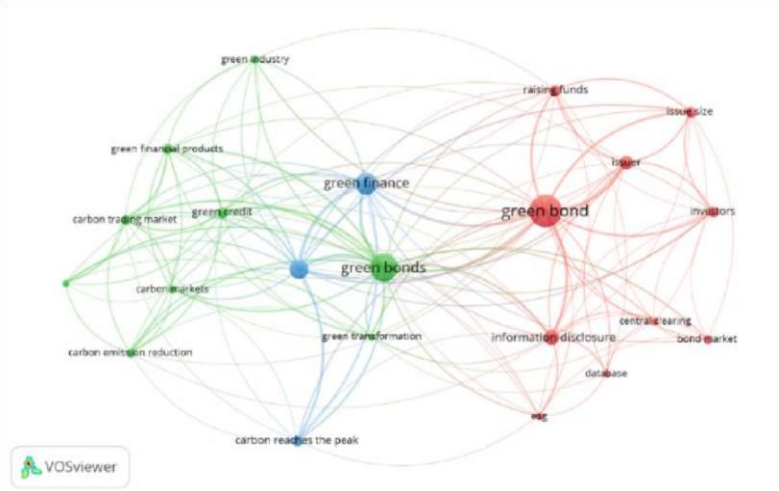
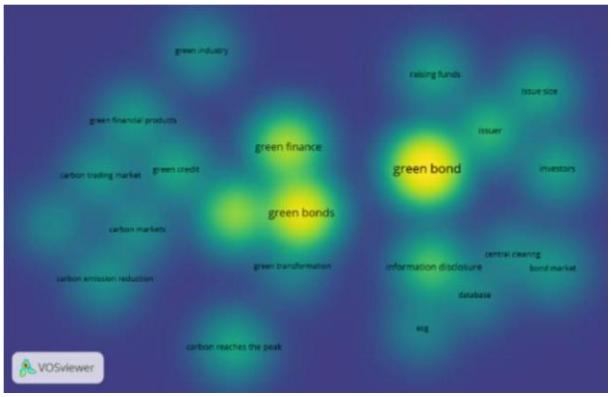


Figure 1: Clustering analysis results based on VOS veiwer

Based on VOSviewer software, this paper makes a cluster analysis of 260 documents from 2015 to 2022 from HowNet and Wanfang Database, and obtains the hot trend and centrality of related topics, as shown in Figure 1 and 2. Among them, green bonds, ESG, issuers and "carbon neutrality" have strong correlation. At present, the research focuses mainly on the performance impact of green bonds, the impact of "double carbon", market premium, system improvement and so on, and the perspective gradually deepens from the macro to the micro level.



Data source: HowNet, Wanfang Database

Figure 2: Collinear Hotspot Analysis Results of VOSviewer

Specifically, in the initial stage of green bond development, Wang Yao [1] first summarized the characteristics of green bond issuance in China, and put forward the key points to ensure the stable operation of the green bond market. After that, the stock of green bond market gradually grew and became the second largest green bond market in the world. Wang Ran [2] compared the international green bond policy with the domestic one, combed

the directivity of the domestic green bond policy in the past five years, and pointed out that compared with European and American countries, the liquidity of the green bond market needs to be improved.

At the micro level, scholars mostly use empirical analysis to analyze the impact of green bonds on enterprises. Zhang Lihong [3] found that green bonds can significantly reduce the financing costs of enterprises. Korea Wen [4] established a Copula function model to analyze the diversification returns of green bonds and other financial securities portfolios. The results show that there is obvious price spillover in the green bond market, and the decentralization composed of industry, energy and public utilities market has the highest return. However, Wu Shinong [5] cited Flammer's cross-border empirical research model and found that the issuance of green bonds itself could not significantly improve the innovation performance of enterprises, but the external supervision brought by the policy of promoting the issuance of green bonds prompted enterprises to make relevant responses. However, at present, the factors affecting the development of green bond market at the micro level have not been defined, and most domestic scholars believe that the issuer is not the main factor restricting the development of green bond market. Gao Xiaoyan [6] concluded that there is no significant correlation between the spread of green bond issuance and the financial situation of enterprises; Ba Shusong [7] pointed out that the main factors promoting the development of China's green bond market include national policy incentives, national standards, issuance convenience and financing preferences.

2. Current situation of Green Bond Issuance in China

2.1 The overall market situation

2.1.1 Rapid development of scale and promotion of international ranking

Over the past five years, China's green bond market has been developing continuously, and achieved a substantial increase in 2021. As shown in Figure 3, by the end of 2021, China has issued a total of US $327 billion of labeled green bonds in domestic and foreign markets, with a total increase of 140% over the same period last year; of which, about 61% meet the CBI green definition. In 2021, China issued 109.5 billion US dollars of labeled green bonds at home and abroad, of which 68.2 billion were in line with CBI's green definition, an increase of 186% over the previous year, reaching a new high. At the same time, China has become the second largest green bond market in the world according to the cumulative issuance and annual issuance of green bonds defined by CBI. As shown in Figure 4, since China announced its "double carbon" target in 2020, China has risen from fourth to second, becoming the second largest market after the United States. However, the domestic green bond issuance is 1% of the total bond market, and there is still much room for improvement.

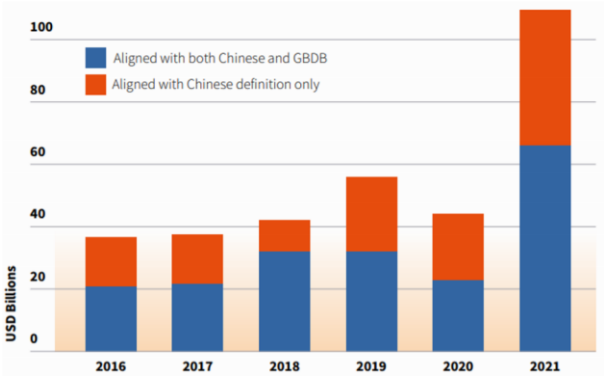


Figure 3: Cumulative green bond issuance in China

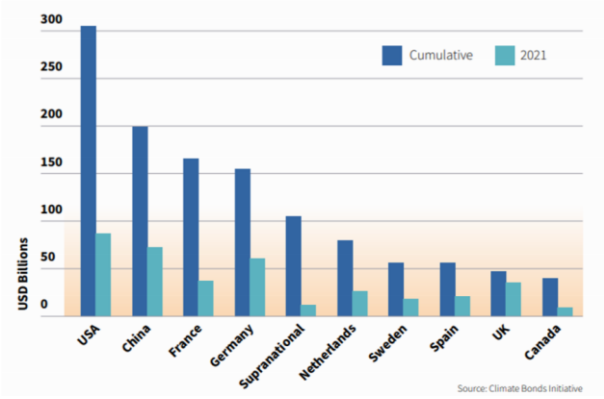
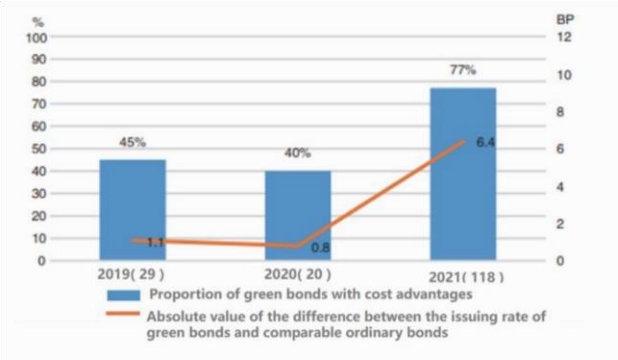


Chart Source: China Green Bond Market Report [8]

Figure 4: Status of international green bond issuance

2.1.2 The interest rate advantage is obvious, and the term collocation is optimized.

Generally speaking, green bonds have more advantages in issuing cost and price than traditional bonds. As shown in Figure 5, compared with the interest rates of green bonds and traditional bonds in 2019-2021, it can be seen that about 40% of the green coupon rates are lower, which is related to the stimulus of relevant incentive policies. In 2021, the proportion of green bonds with the advantage of issuance cost increased significantly to 77%, and the issuance spread increased from 1BP in 2020 to 6BP, which can save the financial cost of the issuer every year. At the same time, the maturity of green bonds is diversified. As shown in Figure 6, most of China's green bonds are three-year bonds. In 2021, the maturity of five-year bonds increased, and even bonds with a maturity of more than 20 years appeared, accounting for 54% within three years, which made up for the liquidity shortage during the epidemic.



Data source: China Central Clearing Company [9]

Figure 5: Comparison of China's Green Bond Issuance Rate and Ordinary Bond Issuance Rate

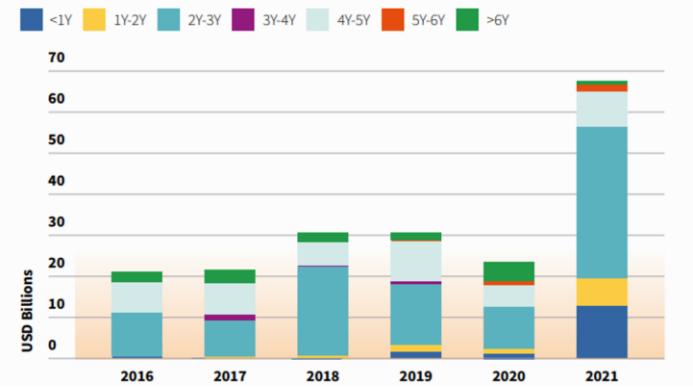


Chart Source: China Green Bond Market Report [8]

Figure 6: Maturity of Green Bonds

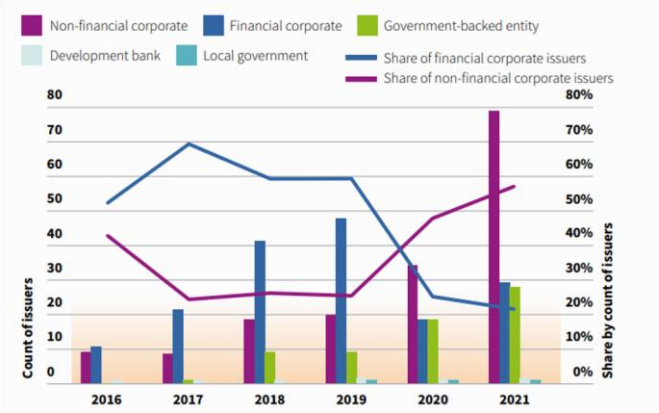
2.1.3 Innovation of products and distribution methods

The innovative ability of China's green bond products and issuance methods has been improved, which is embodied in the following aspects: green bonds with the theme of ecological protection, such as the issuance of 10 billion yuan bonds by China Development Bank to the global market in 2021, to promote the ecological protection and construction of the Yellow River and the sustainable development of the Yangtze River; Carbon neutral thematic bonds, with the purpose of "rural revitalization" and "energy saving and emission reduction", were first innovatively issued by enterprises such as Sanxia Group.

2.2 Issuer information

2.2.1 Non-financial enterprises account for a large proportion of issuance.

Generally speaking, the number of non-financial enterprises issuing bonds has increased sharply in the past two years, becoming the main force in the green bond market. As shown in Figure 7, 2019 is the inflection point for the change of issuer type. Before that, financial institutions accounted for more than half of the total number of issuers each year. After 2020, the relevant national incentive policies were introduced continuously, and by 2021, due to the surge in the number of green bond issuers of nonfinancial enterprises, the green bond issuance of non-financial enterprises exceeded that of financial institutions by 7.1 billion US dollars. At the same time, the issuers are also showing a trend of diversification. Of the 138 issuers in 2021, 94 participated for the first time, which shows that the green bond market is still on the rise and has great potential.



Source: China Green Bond Market Report [8]

Figure 7: Types and Number of Issuers in China's Green Bond Market

2.2.2 State-owned enterprises lead the issuance

Although the types of issuers have increased, state-owned enterprises are still in the dominant position in the green bond market and play an important role in key economic areas such as infrastructure construction in China. As shown in Figure 8, based on the number of issuance, the participation of nonstate-owned enterprises is 2.6%, which is closely related to the policy orientation (Opinions of the Central Committee of the Communist Party of China and the State Council on Implementing the New Development Concept Completely, Accurately and Comprehensively to Do a Good Job in Carbon Peak and Carbon Neutralization). The top three green bonds issued by state-owned enterprises belong to the policy bank bonds issued by the National Development Bank.

Source: China Green Bond Market Report [8]

Figure 8: Proportion of state-owned enterprises and non-state-owned enterprises in China's green bond market in 2021

3. Significance and influence on issue enterprise

3.1 Promote energy conservation and emission reduction, and enhance social image

Firstly, enterprises can reflect their social responsibility by issuing green bonds, so as to enhance their social reputation. Enterprises can convey the concept of corporate social responsibility to society, customers and shareholders by issuing green bonds, so as to enhance the image and popularity of the public. Secondly, the issuance of green bonds has certain requirements for the credit rating, scale, financial level and operating conditions of the enterprise itself, which requires the enterprise to disclose certain information and relevant annual reports in the course of the project's existence, and needs to strictly pass the external review and evaluation,

resulting in a certain threshold for its issuance. Taking the Three Gorges Group, the largest issuer of corporate credit green bonds, as an example, its stock reached 68 billion yuan at the end of the first quarter of 2022, and the implied rating of China's bonds was AAA +, which was widely recognized by the society, and was awarded the annual excellent issuer of corporate bonds on the Shanghai Stock Exchange [8].

3.2 Improve the efficiency of green investment and enhance the level of green innovation

Improving the efficiency of green investment is the key to the green transformation of high energy consumption enterprises. On the one hand, as one of the varieties of green securities, green bonds can directly promote the investment of green enterprises, and with the help of the bias effect of corporate debt maturity, alleviate the problem of maturity mismatch, thereby enhancing growth. On the other hand, the issuance of green bonds helps to strengthen corporate environmental awareness and enhance social responsibility. Quoting Tobin Q theory, the rise of stock price causes the decrease of replacement cost of enterprises. Green investment has gradually become a means for large enterprises to carry out green transformation and upgrading of enterprises.

We can draw lessons from the empirical research model of Xiao Liming [10] to prove the relationship between green securities issuance and green investment efficiency, so as to judge the trend of green investment securities and investment efficiency:

$GIE_{it} = \alpha + \beta GIE_{it} = \delta GS_{it} + \gamma X_{it} + \mu_i + {}_1 + {}_2 t^2 + {}_{it}$ (1) Among them, GS is the core explanatory variable of green securities, GIE is the explained variable of green investment efficiency, it is the province year, X_{it} is the control variable, and ε_{it} is the random disturbance term. Take the 2010-2018 time series as the standard to estimate and draw the trend chart, as shown in Figure 9. It can be seen that the green investment efficiency of green securities and enterprises tends to be consistent, and is in an upward trend. Therefore, it can be basically judged that green bonds can effectively improve the efficiency of green investment of issuers and promote their green innovation.

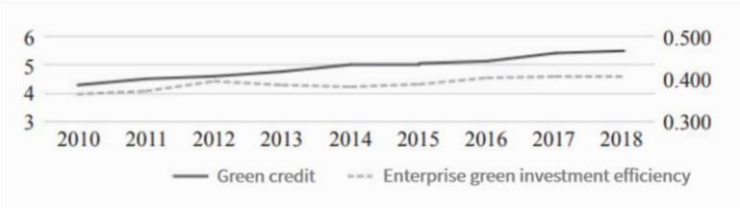


Figure 9: Green Securities and Enterprise Green Investment Efficiency Trend Chart [10]

3.3 Reduce financing costs and accelerate green transformation

Compared with ordinary bonds, green bonds have certain advantages and can reduce the financing cost of enterprises. As shown in Table. 1, comparing green bonds with general credit bonds from January 2021 to May 2022, it can be seen that the median spread of 3A-level green credit bonds is 64BP, which is 23.8% lower than that of general credit bonds in the same period. The spread performance is more stable and has a certain cost advantage of issuance.

Table 1: Comparison of spreads between green bonds and ordinary bonds

Category	Level	Number of samples	Median Issue Spread (BP)
Green Credit Bond	AAA	314	64
	AA+	43	106

	AA	24	122
General debenture	AAA	4807	84
	AA+	4332	145
	AA	3249	275

Data source: Wind database

At the same time, green bonds can attract social funds to participate in the construction of green projects, provide environmental protection support, and guide issuing enterprises to develop in the direction of green energy conservation, promote the improvement of industrial environmental quality, promote green technological innovation of enterprises, and further reduce production costs and financing costs, so as to achieve a virtuous circle. According to the 2021 Green Bond Market Report, most of the funds raised in China's green bond market (88.3%) were invested in renewable energy, low-carbon transportation and low-carbon buildings. According to the calculation of China Bond-Green Bond Environmental Benefit Data Platform, the green projects raised by such bonds can reduce carbon dioxide emissions by 160 million tons and sulfur dioxide emissions by 1.2 million tons per year, which has a good role in promoting the realization of "double carbon".

4. Current problems

4.1 The market is relatively small and less liquid

Since 2019, China's green bond market has developed rapidly, but the size of the green bond market is still small in the overall bond market. According to the China Green Bond Market Report 2021, the stock of green bonds at the end of the year was 120 million yuan, accounting for only 0.89% of the total market stock. It can be seen that the market participation is still relatively low, and the green bond market still has a large space.

At the same time, compared with conventional bonds, the liquidity of green bond market is low. According to the statistics of China Sustainable Bond Market Development Report [11], in terms of market turnover, the liquidity of the secondary market of green bonds is generally lower than that of all credit bonds and policy-based financial bonds in China. In 2020, the scale of China's green bond market expanded significantly, with a turnover of 634.63 billion yuan in the secondary market and a total trading volume of 253 trillion yuan in the bond market, of which 13.37 trillion yuan was traded in local policy bonds, and the activity of green bonds was relatively low. In terms of turnover rate, the turnover rate of green bonds is generally lower than that of credit bonds and policy-based financial markets, with an average monthly turnover rate of 6.4%, which is lower than that of the latter 20.3%.[12]

4.2 Information disclosure is not standardized and the system guarantee needs to be improved.

Firstly, compared with the international system, China lacks clear information disclosure standards, only makes relevant environmental benefit requirements for some green exhibits, and the information disclosure requirements are different, and there is no uniform standard. For example, in 2015, the People's Bank of China issued the Announcement on the Issuance of Green Financial Bonds in the Interbank Bond Market [13], which encourages its environmental benefit assessment team. Second, the supervision of green bond fund raising is relatively loose. The inconsistency of information disclosure system standards and regulatory requirements can easily lead to enterprises raising funds on the grounds of green projects, but the projects invested do not meet the green standards, which brings opportunities for speculation such as "green washing ".

4.3 The issuer is relatively single, and the participation of private enterprises is insufficient.

On the whole, the main body of green bond issuance market in China is relatively single, which is mainly reflected in two aspects: on the one hand, green financial bonds have always occupied the dominant position, while green corporate bonds and green corporate bonds are issued on a small scale. Despite the increase in the number of non-financial enterprises issued in recent years, according to the Wind database and the report of China's green bond market [8], the issuance of green financial bonds in 2019 amounted to 402.9 billion yuan, accounting for more than 60% of the total issuance scale, and showing the characteristics of single issuance.

On the other hand, as mentioned above, the main issuers are state-owned enterprises, whose issuance scale is 98 times that of non-state-owned enterprises, whose participation is low, and their willingness to invest in green bonds is relatively low. Because of the high cost of issuing green bonds and the fact that their yields have no significant advantages over traditional bonds, their qualification certification threshold is high, and they are not attractive to small and medium-sized enterprises with small scale and low qualifications.

5. Countermeasures and suggestions

5.1 Unify certification standards and improve information disclosure

Due to the different types of bonds and supervision methods, there are no uniform and clear regulations on the use of enterprise funds, third-party evaluation criteria, and the degree of information disclosure. Therefore, we should first clarify the criteria for identifying green bonds, frame the specific categories of green projects in various industries, and then divide the elements of bonds. Standardize the third party certification system.

On the other hand, through the construction of information disclosure database, we can enhance the transparency of information disclosure by means of financial science and technology, promote the issuance and investment of green bonds at home and abroad, prevent the phenomenon of "green washing", create a good investment environment, enhance international recognition, so as to introduce international funds, improve the liquidity of bond market and bring incremental effects.

5.2 Expanding incentive mechanism and increasing policy support

Because of the long investment income cycle and high issuance cost of green projects, the government can introduce corresponding incentive policies to attract the participation of multiple social subjects and promote the diversification of issuers.

On the one hand, large enterprises with high contribution to the green bond market should be given publicity and policy incentives, such as appropriately reducing the minimum issuance scale, relaxing the proportion of financing to green projects, enhancing their social image and facilitating the investment channels of high-quality issuers.

5.3 Enhance the ability of green innovation and accelerate the green transformation of enterprises

Green innovation plays an important role in the green transformation of enterprises, in addition to promoting environmental protection, helping enterprises to improve economic performance and investment value, at the same time, for the whole bond market, green innovation can arouse investors' attention, it has a positive effect on the value growth of listed companies, and it is a good reference for investors' investment decision-making. So as to guide more social funds to participate in green bond investment, increase the size of the bond market, enhance liquidity and "green premium".

At the same time, enterprises can further clarify the green transformation plan, strengthen the new industrialization transformation of traditional industries, introduce advanced technology, select green project investment, improve profitability through a variety of green asset portfolios, form a benign sustainable development model, promote

the transformation of high energy consumption production mode to green low consumption, and move closer to the goal of "double carbon".

6. Conclusion

From the perspective of corporate issuers, this paper explores the impact of green bond issuance on enterprises, analyzes the current situation and problems of China's green bond market, and puts forward relevant countermeasures. As a new financing channel, green bonds play an important role in enhancing the innovation ability of enterprises, improving the efficiency of green investment, promoting transformation and upgrading, and enhancing the social image. Faced with the problems of regulatory disclosure, low market liquidity and single participant in the current market, we should speed up the cultivation and construction of the green bond market, optimize the system, and enhance the credibility of information disclosure, so as to ensure the sustainable development of the green bond market.

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