

Research on the Scale and Path of Green Finance Supporting Real Economy from the Perspective of Green Development

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Abstract: Guiding financial resources to the field of green development, developing green finance, innovating financial ecosystem and fully and effectively supporting the development of real economy has become an urgent need to promote the development of green finance and stimulate the vitality of real economy at this stage. According to the calculation standard of the total amount of green finance business evaluated by the people's Bank of China, this paper considers the scale of green finance supporting the real economy with two indicators: the balance of green loans and the holding of green bonds. It is found that green credit is the main force of green finance to support the growth of real economy. A variety of new green bonds inject new funds into green finance to support the growth of the real economy. Green credit mainly selects the path to support the the real economy through credit investment.

1 INTRODUCTION

“Guidance of building a green financial system” puts forward that green finance to refer to economic activities to promote the improvement to the environment, cope with climate change and improve the efficiency of resource conservation, that is, investment and financing, project management and operation in many fields such as environmental protection, energy conservation, cleaning, green transportation and green construction Financial services provided by risk prevention and control activities.

In 2021, the central bank will take guiding financial resources to the field of green development as the top ten tasks. The third session of the 13th National People's Congress pointed out that in 2020, China will still take strengthening eco-environmental governance and promoting the construction of ecological civilization as one of its key tasks. In order to ensure the realization of the phased objectives of pollution prevention and control and improve the effectiveness of eco-environmental governance, it is necessary to give further play to the role of green financial resource allocation and support the real economy. We will guide more social capital into the field of ecological and environmental governance, to support the development of energy conservation and

environmental protection industries, and then to support the fight to protect the blue sky, clear water and pure land.

The main contribution of this paper lies in the following three aspects. Firstly, building the basic theoretical analysis framework of green finance supporting the real economy and enriching the research content of them; Secondly, guiding the transformation and development of traditional finance to green finance, promoting the harmonious development of real economy and ecological environment, and seeking new profit growth points; Finally, it provides theoretical guidance for financial enterprises, real economy, governments at all levels and other departments, and provides suggestions and strategic references for realizing green economic development.

2 LITERATURE REVIEW AND BRIEF REVIEW

Clean energy, green financing, and green economy development are significant and positive indications towards a cumulative measure of sustainable practices. Similarly, green bonds, clean energy, and green economy development play a constructive role when all three pillars of sustainable development

practices are analyzed individually (Yang, et al., 2022).

2.1 Research on the Path of Financial Support for Real Economy

Since 2010, Professor Ma Jun has given guiding suggestions of the policy guidance, system construction and theoretical framework for the development of green finance, and leading Chinese scholars to study the path of financial support for the real economy. The research conclusions mainly include as improving the financial environment and financial structure, (Li, 2011, Han, 2011) and the path of financial support for the real economy (Ba, 2013, Shen, 2013). Studies the influencing factors of financial services real economic growth based on the efficiency dimension (Zhang, 2017, Zhang, 2017). Industry characteristics can significantly affect the Risk Spillover level of the real industry, and the changes of macro-financial and economic environment will significantly affect the Risk Spillover from the financial industry to the real industry (Huang, 2021, Shang, 2021, Liu, 2021). Based on the perspective of supply chain, it is found that the mitigation of financing constraints brought by enterprise shareholding financial institutions can overflow with their main suppliers and customers (Tang, 2021, Xie, 2021). Affected by technological progress, the overall development efficiency of financial support to the real economy shows an upward trend, and the development efficiency of regional financial support to the real economy shows obvious regional differences (Chen, 2021).

2.2 Research on the Relationship between Green Financial Efficiency and Economic Development

The "green" fiscal policy has no significant impact on the allocation efficiency of green finance, and the lack of "green" regulatory policy inhibits the positive effect of financial development on the allocation efficiency of green finance (Wang, 2018, Wang, 2018). Green financial instruments, fiscal expenditure, population and other factors will have an impact on the ecological efficiency of green investment, and then affect the improvement in the development efficiency of green finance (Zhou, 2020, Zhang, 2020, Tang, 2020). Green finance helps to promote high-quality economic development and promote the transformation and upgrading of the economic structure by promoting industrial structure

upgrading and enterprise technological innovation (Liu, 2021, He, 2021).

These studies are instructive because of their strong problem awareness. The deficiency is that they do not use two indicators of green credit and green bonds to explain and analyze in detail that the scale and path of green finance supporting the real economy.

3 SCALE AND PATH OF GREEN FINANCE TO EFFECTIVELY SUPPORT THE REAL ECONOMY

The data in this paper comes from annual reports of financial institutions, CSMAR database resources (cn.gtadata.com), collated by the authors.

According to the regulations of the people's Bank of China, since July 2021, green finance work of banks will be evaluated in accordance with "Green finance evaluation scheme for banking financial institutions". The regulation points out that the total amount of green financial business refers to the weighted sum of the balance of various green financial businesses of the participating institutions during the evaluation period. Total green finance business = $\sum \lambda_i * G_i$, where λ_i represents the weighting coefficient, G_i represents the balance of green financial business, and the total amount of green financial business includes two items, i.e. green loan balance and green bond holdings, which are both with a weight of 1.

3.1 The Ability of Green Finance to Support the Real Economy and Green Transformation Has Increased Rapidly Year after Year

In 2016, China made significant progress in the development of green finance. The first medium-term note of "green Debt Loan Based Portfolio" was issued. The most important thing is the case that China's issuance of green bonds ranked first in the world. In 2017, Guizhou, Zhejiang, Guangdong, Jiangxi, Xinjiang and the five provinces and their important cities carried out the pilot construction of green financial innovation pilot zones. In 2018, the above five national pilot provinces of green finance reform took the determined financial innovation as the main line to promote the development of green industry, explored the construction of green financial

service system, tried to develop green financial organizations, developed and innovated green financial businesses and products, and made efforts to optimize the policy environment for the development of green finance. Actively explore valuable experience in finance to support the construction of ecological civilization and promote the transformation of economy to green. In 2019, the pilot provinces initially formed a green financial service system, and formed the characteristics of different regions, different economic development levels and different resource endowments, which accumulated experience in promoting financial support for the construction of ecological civilization and promoting the transformation of economy to green.

A new pattern of regional financial development characterized by complementary functions and superposition of advantages has been initially formed. In terms of being compatible with the integrated development of the Yangtze River Delta, green credit grew rapidly, with a year-on-year increase of 29.6%. In addition, backward western regions such as Xinjiang, Sichuan, Ningxia and Gansu supply the capital gap by issuing debt financing instruments in key areas such as poverty alleviation, entrepreneurship and green development.

3.2 Green Credit Is the Main Force of Green Finance to Support the Growth of Real Economy

3.2.1 the Scale of Green Credit Supporting the Real Economy Has Increased Rapidly Year after Year

Table 1 presents main names and Short codes of green credit banks. there were 20 major banking institutions engaged in green credit business. Figure 1 to 3 shows that, from 2008 to 2020, promotion of green credit business mainly depends on policy banks and large state-controlled commercial banks. However, in recent three years, the number of joint-stock commercial banks carrying out green credit business has increased year by year, and the green credit funds issued have an obvious upward trend year after year, playing an increasingly important role.

Figure 4 shows that, according to the specific analysis of statistical data, the average credit balance of China Development Bank is 1724.491 billion yuan, ranking first, which is a policy bank. The average credit balance of Industrial and Commercial Bank of China is 1176.918 billion yuan, the average

credit balance of Agricultural Bank of China is 881.277 billion yuan, the average credit balance of China Construction Bank is 627.023 billion yuan, and the average credit balance of Bank of China is 397.433 billion yuan, ranking second to fifth respectively. The four banks above are all large state-controlled commercial banks; Among joint-stock commercial banks, Shanghai Pudong Development Bank and Postal Savings Bank of China rank the top two in the average credit balance, and the number of banks participating in green credit is increasing year by year, and the distribution scale is increasing year by year.

Table 1: Comparison table of main names and Short codes of green credit banks.

Serial number	Bank Name	Short code	Bank Nature
1	China Development Bank	CDB	1
2	Export-import Bank	EB	1
3	Agricultural Development Bank	ADB	1
4	The bank of China	BOC	2
5	China Construction Bank	CCB	2
6	Industrial and Commercial Bank of China	ICBC	2
7	Agricultural Bank of China	ABC	2
8	Societe generale	CIB	3
9	Guangdong development bank	GDB	3
10	Bank of communications	COMM	2
11	Shanghai Pudong Development Bank	SPDB	3
12	Ping an bank	SPANK	3
13	China Minsheng Bank	CMBC	3
14	China merchants bank	CMB	3

15	China citic bank	CITIC	3
16	Everbright bank	CEB	3
17	Huaxia bank	HXBANK	3
18	Zheshang bank	CZBANK	3
19	Bohai sea Bank	BOHAIB	3
20	Postal Savings Bank of China	PSBC	3

Description:1- Policy banks; 2- Large state-controlled commercial banks; 3- Joint-stock commercial banks.

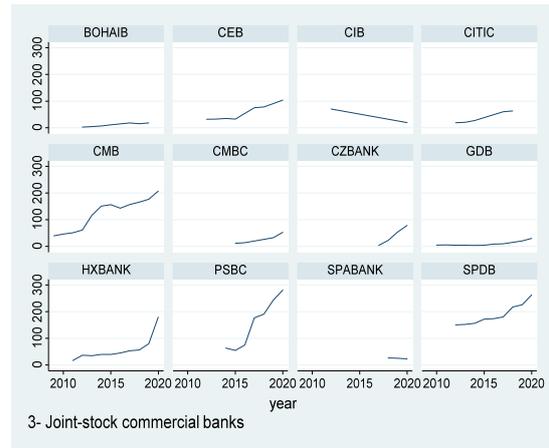


Figure 3: Loan balance of green credit (3-Joint-stock commercial banks).

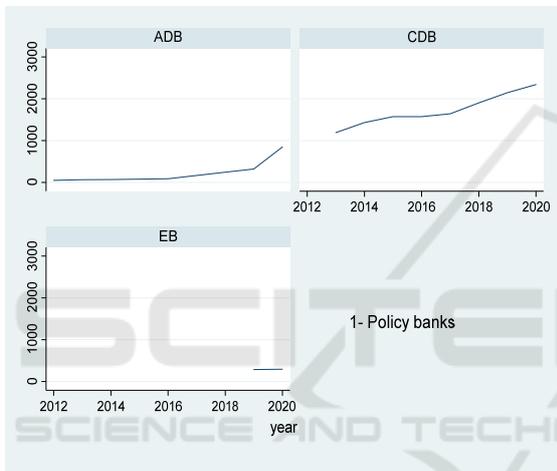


Figure 1::Loan balance of green credit (1- Policy banks).

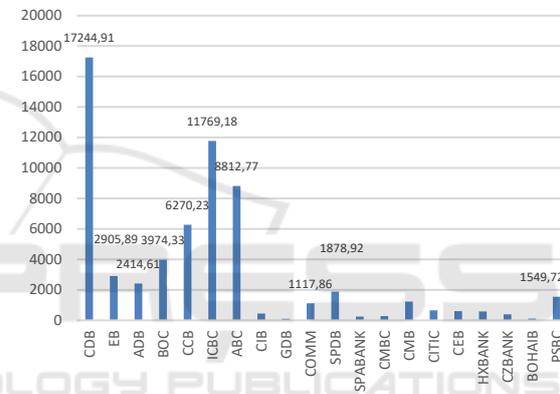


Figure 4: Average of green credit balance (Unit:100 million yuan).

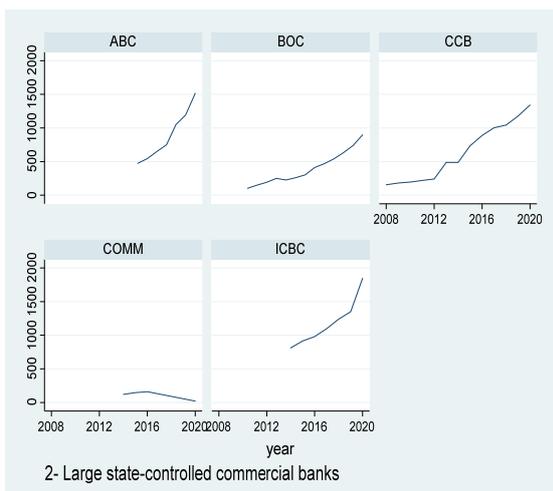


Figure 2: Loan balance of green credit(2- Large state-controlled commercial banks).

3.2.2 the Path of Green Credit Supporting the Real Economy Is Mainly Reflected in the Direction of Credit Investment

Table 2 presents , from 2008 to 2020, among the two first-class green real economy comprehensive projects, that the green credit support rate of energy conservation and environmental protection and service project (B01) reached 98.48%, and the green credit in strategic new industries project (B02) accounted for only 1.52%. Specifically, the cumulative balance of green credit for investment in energy conservation and environmental protection project, a comprehensive first-class project, accounts for 51.08% at the end of the year.

It is a comprehensive investment project without specific second-class project classification; The first level project includes 11 second level projects. Figure 5 shows that the top four second level projects supported by green credit are green transportation

project accounting for 19.23%, renewable and clean energy project accounting for 8.24%, building energy saving and green building project accounting for 5.66%, and industrial energy conservation, water conservation and environmental protection project accounting for 3.69%. Therefore green credit investment reflects the path choice of green finance to support the real economy.

Table 2: Green Project loan balance (Unit: 100 million yuan).

Item Code	Project Category Name		ratio
B01	Energy conservation and environmental protection and service project	47035.18	51.08%
B0101	Green agriculture development project	708.16	0.77%
B0102	Green forestry development project	447.79	0.49%
B0103	Industrial energy conservation, water conservation and environmental protection project	3402.47	3.69%
B0104	Natural protection, ecological restoration and disaster prevention and control project	1622.74	1.76%
B0105	Resource recycling project	954.61	1.04%
B0106	Garbage treatment and pollution prevention and control project	1543.55	1.68%
B0107	Renewable and clean energy project	7586.30	8.24%
B0108	Rural and urban water project	2270.84	2.47%
B0109	Building energy saving and green building project	5216.21	5.66%
B0110	Green transportation project	17709.96	19.23%
B0111	Energy saving and environmental protection service	2188.12	2.38%
B02	Green credit in strategic new industries project	1400.00	1.52%
total		92085.93	100%

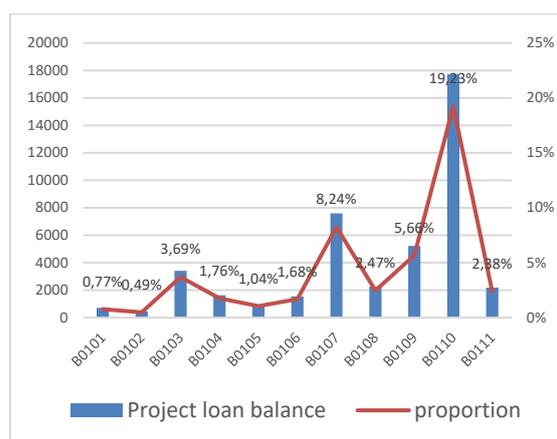


Figure 5: Project loan balance and proportion in B01.

3.2.3 a Variety of New Green Bonds Came out, Injecting New Funds into Green Finance to Support Real Economic Growth

As shown in Table 3, from 2016 to 2021, there were 14 main types of green bonds issued. The top five in the cumulative total issuance scale were General financial bonds issued 339.825 billion yuan, accounting for 17.52%; Corporate bonds issued 328.66 billion yuan, accounting for 16.95%; Green debt financing vehicle issued 286.721 billion yuan, accounting for 14.78%; Ordinary financial bonds of commercial banks issued 225 billion yuan, accounting for 11.60%; General corporate bonds issued 174.57 billion yuan, accounting for 9.00%.

However, from 2016 to 2018, the top five bond types with cumulative issuance scale were Ordinary financial bonds of commercial banks, Corporate bonds, General financial debt, Policy financial debt and General corporate bonds. Compared with the latter, the former has changed significantly. It shows that the issuance proportion of large state-controlled commercial banks has decreased significantly, the issuance proportion of joint-stock commercial banks ranks first, the issuance scale of entity enterprises other than financial institutions is of great importance, and there is a major breakthrough in green debt financing as an emerging bond type.

Table3: Ranking of cumulative size of green bond issuance (100 million yuan).

Rank	Bond Nature	Scale	Ratio
1	General financial debt	3398.25	17.52%
2	Corporate bonds	3286.6	16.95%
3	Green debt financing vehicle	2867.21	14.78%
4	Ordinary financial bonds of commercial banks	2250	11.60%
5	General corporate bonds	1745.7	9.00%
6	Policy financial debt	1466	7.56%
7	Non-public offering of corporate bond	1230.73	6.35%
8	Asset-backed securities	1103	5.69%
9	Asset-backed notes	1007	5.19%
10	Medium-term notes	467.06	2.41%
11	Local government debt	275.13	1.42%
12	Ultra-short term financing paper	249.5	1.29%
13	Private private debt financing instruments	25.6	0.13%
14	Short-term finan	16.5	0.09%

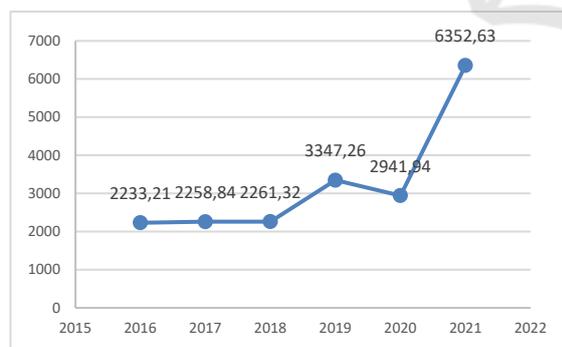


Figure 6: Trends of green bond issuance scale (100 million yuan).

In addition, from 2016 to 2021, figure 6 shows that the issuance scale of green bonds showed an overall growth trend, and the number of issuance increased from 82 to 652. Even in 2020, when the global economy was volatile due to the epidemic, the issuance scale of green bonds in China was only

slightly reduced. The overall issuance scale in 2021 was 635.263 billion yuan, 2.16 times than that in 2020, exceeding the sum of the issuance scale in the previous two years.

4 FURTHER BROADEN THE SCALE AND PATH OF GREEN FINANCE TO SUPPORT THE REAL ECONOMY

According to the “Statistics of China Green Finance Development Research Report 2020”, the total supply of green finance funds in China has increased significantly, and the gap between supply and demand has gradually narrowed. However, green finance still faces some problems in supporting the real economy, such as the small number of green listed enterprises, the small scale of green insurance, and the slow development of new green finance products such as green development fund, green guarantee fund, carbon financial products and other derivative financial instruments. Therefore, from the perspective of green development, determining the “two cores” of the new model of green finance supporting the real economy and the “two paths” of the new path of green finance supporting the real economy is a realistic choice to further expand the scale of green finance supporting the real economy and promote green finance to effectively support the growth of the real economy.

4.1 “Two Cores” of the New Model of Green Finance Supporting the Real Economy

We should actively explore a new model for the development of green finance, build an all-round system, take the accurate grasp of “green or not” and “sustainable green” as the two core, and based on four green financial products such as green credit, green bonds, green funds and green insurance, set up green banks, take the healthy green financial market as the medium, and form a green financial system as the guarantee. Building a new multi integrated green finance development model with green finance innovation pilot zone as the new fulcrum. To achieve financial support for the development of ecological industries, comprehensively drive the transformation and upgrading of advantageous industries, and realize mutual benefit and mutual promotion between finance, economy, society and ecology.

4.2 “Two Paths” for Green Finance to Support the Real Economy

The in-depth development of green finance is inseparable from the in-depth exploration of scientific research and theory, the support and incentive of government policy, the innovative development of market practice, the coordination and cooperation of green financial policy-making departments and the strong support of market subjects. Therefore, to support the development of real economy, green finance should follow two paths that the top-level promotion of “top-down” and the grass-roots exploration of “bottom-up”, so as to promote the sustainable development of green finance.

5 CONCLUSIONS

In this paper, the balance of green loans and the holding of green bonds are used to calculate the total amount of green finance business, and the scale and path of green finance to support the real economy are considered.(1) Policy banks led by China Development Bank and four large state-controlled commercial banks are still the main force of green credit to support the growth of real economy, but a large number of joint-stock commercial banks gradually participate in green credit business, which will be the new force of green credit business in the future. It will play an important role in further expanding the scale of green credit.(2)Green credit selects the path of supporting the real economy through credit orientation, and the credit support of energy conservation and environmental protection projects and services far exceeds that of green credit projects in strategic new industries. (3) A variety of new green bonds inject new funds for green finance to support the growth of real economy. The issuance scale of General financial debt,Corporate bonds and Green debt financing vehicle ranked the top three.

However, from the perspective of green development, it is still an arduous task to expand the scale of the real economy supported by green finance and explore effective operation paths. We should continue to explore the "two cores" of a new model of green finance supporting the real economy and the "two paths" of a new path of green finance supporting the real economy, so as to jointly contribute to the standardized, healthy and sustainable development of green finance supporting the real economy.

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