

Research On the Stock Price Effect of Green Bonds Issued by Real Estate Enterprises——Take Sino-Ocean Group as An Example

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Abstract. With the escalation of environmental problems caused by climate change, all sectors of society have begun to recognize the key role of the financial system in achieving the sustainable development goals, which has triggered the rapid rise of green finance. In this context, as an emerging financing tool, green bonds not only provide financial support for real estate enterprises to develop green industries, but also meet the sustainable development needs of the industry. This paper takes Sino-Ocean Group, a representative real estate enterprise, as an example, and uses the event study methodology to analyze the stock price effect of its green bond issuance, so as to determine whether the issuance of green bonds can help improve the market performance of real estate enterprises.

Keywords: Green bonds; Real estate; Event study methodology.

1. Introduction

In the context of climate change, in order to control global greenhouse gas emissions and promote the green transformation of the economy, the concept of green investment and financing began to affect the financial market, and the concept of green finance was born. As an important part of green finance, the rise of green bonds aims to direct capital to the low-carbon economy. By raising funds to support green projects, green bonds not only meet the financing needs of green industries, but also help reduce carbon emissions and improve environmental benefits. Therefore, green bonds are of great significance to promote the green and low-carbon transformation of the real economy and promote sustainable economic development.

With the tightening of the industry's financing environment, real estate enterprises are facing huge financial pressure in the process of green transformation. Green bonds open up new financing channels for the real estate industry, which can not only promote real estate enterprises to vigorously develop energy-saving and environmentally friendly green building projects, but also enhance the sustainable development image of enterprises. However, China's real estate green bond financing is still in its infancy, and there are few existing cases and experience in issuing green bonds. Based on this, this paper takes Sino-Ocean Group as the research object to deeply analyze the short-term stock price effect of its green bond issuance, aiming to reveal the actual market impact of green bonds on real estate enterprises, in order to provide experience for other real estate enterprises to carry out green bond financing, and encourage more enterprises to achieve green transformation through green finance.

2. Sino-Ocean Group's green bond issuance

2.1. Company Profile

Sino-Ocean Group Holdings Limited ("Sino-Ocean Group") was established in 1993 and listed on the Hong Kong Stock Exchange in September 2007 (03377.HK). Sino-Ocean Group's core business includes residential development, real estate development and operation, property services and construction industry chain services, other businesses include real estate finance, data real estate,

logistics real estate, elderly care services and other sectors. Sino-Ocean Group takes "building health" as its brand concept, deeply cultivates the main business of investment and development, and is committed to providing owners with a healthy and comfortable living environment. Since its establishment, the group has successively entered North China, Northeast China, East China, Southwest China and Central China and other regions. It has accumulated more than 600 development projects in more than 80 cities in China, achieving high-quality and large-scale development.

2.2. Basic information on green bond issuance

Sino-Ocean Group established a green finance framework in February 2021 and obtained an independent second-party opinion from the authoritative ESG rating agency Sustainalytics, laying a solid foundation for Sino-Ocean Group's green bond issuance. On 5 May 2021, Sino-Ocean Group successfully issued its first US\$400 million five-year secured green notes on the Hong Kong Stock Exchange. With its business philosophy of "Building Health" and steady development, Sino-Ocean's first green bond aroused strong repercussions in the market, achieving a peak order volume of US\$2.1 billion and an oversubscription of 5.25 times. The coupon rate of 3.25% not only created the lowest issuance rate of green bonds by Chinese real estate companies in the same period that year, but also set a new record for the lowest interest rate on dollar debt of Sino-Ocean Group that year.

3. Analysis of the stock price effect of Sino-Ocean Group's issuance of green bonds

3.1. Mechanism of stock price effect

Stock prices usually reflect the market's expectations for the company's future profitability, operating conditions, and development prospects. Investors express their judgments on company performance and industry trends by buying and selling stocks, which leads to ups and downs in stock prices. Based on this, Sino-Ocean Group's green bond issuance announcement may affect the investment willingness of market participants. On the one hand, the issuance of green bonds can convey the company's sustainable development concept to the outside world, attract more investors who pay attention to environmental protection issues, and thus promote the stock price. On the other hand, the issuance of green bonds may increase the debt burden and may also have an adverse impact on the stock price if the market is skeptical about the company's financial health. Ultimately, the reactions and decisions of market participants will be reflected in the stock price, so the short-term market effect of Sino-Ocean Group's issuance of green bonds can be judged through the fluctuations in stock prices.

3.2. Analysis of stock price effects based on event study methodology

The event study methodology is a quantitative research method mainly used to evaluate the short-term and long-term impact of a specific event on asset prices. For listed companies, by comparing the changes in stock prices before and after the event, the specific reaction of the market to the event can be accurately revealed. To this end, this paper uses the event research method to analyze the stock price effect of Sino-Ocean Group's green bond issuance. The specific steps are as follows:

3.2.1 Define the window period

The event window includes the event window and the estimation window. An event window is a time frame that includes the event under study and its impact period, helping to more accurately capture the short-term impact of that event on stock prices. An estimation window is a specific period of time before an event window and is used to calculate the expected rate of return based on market movements during that period.

This paper takes the issuance of the first green bond by Sino-Ocean Group as the research object, and the date on which Sino-Ocean Group announced the issuance of green bonds, that is, April 20, 2021, is set as the base date of the event. This paper selects the 10 trading days [-10, 10] before and

after the event base date as the event window period for this study, that is, from April 1, 2021 to May 4, 2021. A total of 120 trading days from 130 trading days to 11 trading days before the event base date [-130, -11] are selected as the estimation window period of this event, that is, from October 7, 2020 to March 31, 2021.

3.2.2 Build the model

This paper chooses the market model to estimate the expected normal rate of return. The model assumptions are as follows:

$$R_t = \alpha + \beta R_{mt} \quad (1)$$

Among them, the individual stock return rate at a specific time (R_t) is used as the explained variable, the corresponding market return rate (R_{mt}) is used as the explanatory variable, β represents the degree of change of the individual stock return rate relative to the market return rate, and α represents the constant term of the prediction model.

This paper selects the Hang Seng Real Estate and Construction Industry Index as the corresponding stock market and obtains the market return rate and Sino-Ocean Group stock return rate data during the estimation window period from the Choice Financial Terminal. Then, use the least squares method to conduct regression analysis, and obtain the regression equation of the expected return rate:

$$E(R_t) = 0.9583R_{mt} - 0.0008 \quad (2)$$

3.2.3 Calculate abnormal return and cumulative abnormal return

Abnormal return (AR) refers to the difference between the actual rate of return and the expected rate of return calculated according to the regression equation, and cumulative abnormal return (CAR) refers to the result of the accumulation of abnormal return within the window period. The specific calculation formulas are as follows:

$$AR_t = R_t - E(R_t) \quad (3)$$

$$CAR_t = \sum AR_t \quad (4)$$

Through the above formulas, the abnormal return (AR) and cumulative abnormal return (CAR) during the window period can be calculated. The results are shown in Table 1:

Table 1. The values of AR and CAR during the event window period

t	AR	CAR	t	AR	CAR
-10	0.1775%	-0.0069	1	-1.4153	0.0022
-9	0.3390	0.5165	2	0.4588	0.4610
-8	-1.0674	-0.5510	3	0.8408	1.3018
-7	0.1342	-0.4168	4	-0.9624	0.3394
-6	0.2415	-0.1753	5	0.0504	0.3898
-5	0.4347	0.2593	6	-0.5205	-0.1307
-4	-0.6481	-0.3887	7	2.7031	2.5725
-3	0.9678	0.5790	8	-1.5332	1.0393
-2	-0.5108	0.0682	9	-0.6534	0.3859
-1	0.3830	0.4511	10	-0.0904	0.2955
0	0.9664	1.4176			

3.2.4 Significance test and result analysis

In order to determine whether the abnormal return is caused by the green bond issuance announcement, this paper uses the t-test statistical method to test the significant difference between CAR and 0. The hypothesis is as follows:

H_0 : $CAR=0$, Sino-Ocean Group's issuance of green bonds has no impact on stock price changes.

Using Stata software to conduct t-test, the test results are shown in Table 2. The P value is 0.0188, which is less than the significance level of 0.05, so the null hypothesis is rejected, indicating that Sino-Ocean Group's issuance of green bonds has a significant impact on the company's stock price changes.

Table 1. The results of the T-test

Variable	Test value =0					
	T	Obs	P	Std.dev.	95% conf.interval	
					Upper limit	Lower limit
CAR	2.6278	20	0.0161	0.7177	0.0843869	0.7340898

Figure 1 shows the changing trends of abnormal return and cumulative abnormal return within the event window. In the 10 trading days before the announcement, the changes in abnormal return rates were relatively stable, with the overall fluctuation range of about -1% to 1%. From the two trading days before the event to the day of the issuance announcement, the abnormal return gradually increased, achieving significant growth from negative to positive. Within 10 trading days after the issuance announcement date, the abnormal return increased significantly on the 2nd and 3rd trading days, reached its peak in the 7th trading day, and then fell rapidly on the 8th trading day. It can be seen that the release of the green bond announcement had a positive impact on the company's stock price, but it did not promote the continuous rise of the stock price, which indicates that its influence is relatively limited.

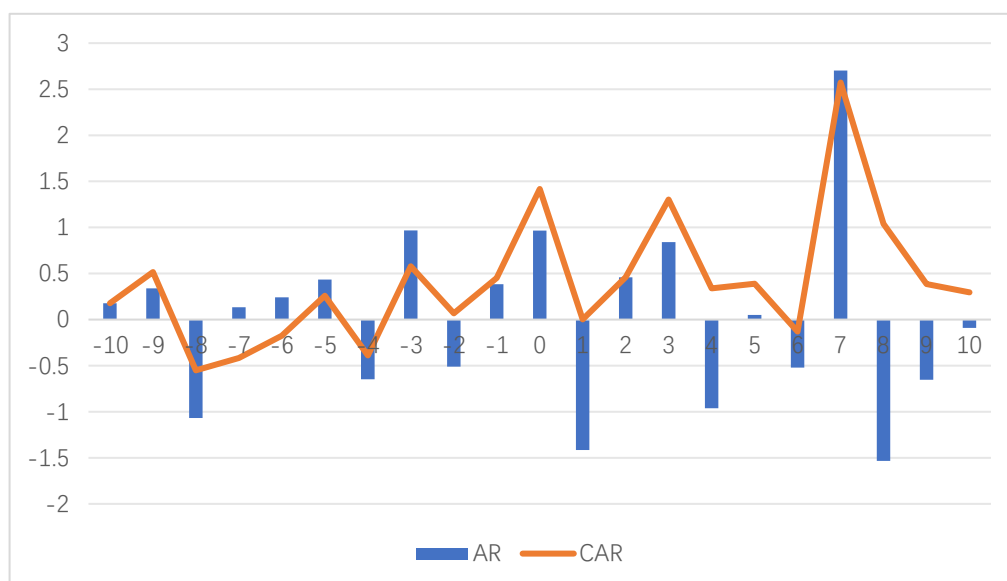


Fig. 1 The trend chart of AR and CAR during the window period

Judging from the cumulative abnormal return, the cumulative abnormal return rate within the event window period shows a fluctuating trend of rising first and then falling, and the range of change after the event date is more obvious. In the 10 trading days before the event base date, the cumulative abnormal return rate showed three negative values. As the announcement day approached, the ratio began to rise steadily, and climbed significantly on the day of the announcement. Within 10 trading days after the event base date, the cumulative abnormal return showed a very obvious upward trend, especially the most prominent increase on the 7th trading day, reaching a peak of 2.57%. From the above analysis, it can be seen that the issuance of Sino-Ocean Group's first green bond brought significant positive abnormal returns and had a positive promotion effect on its stock price.

4. Conclusion

With the improvement of relevant policy systems and market infrastructure, the green bond market is gradually moving towards normal development. In contrast, the scale of green bond financing in the real estate industry still has great development potential. Through the research and analysis of the green bonds issued by Sino-Ocean Group, it can be found that the issuance of green bonds has had a certain degree of positive impact on the stock price of the company, indicating that investors have good expectations for the green and sustainable development of Sino-Ocean Group. At present, green and low-carbon transformation has become an important starting point for the real estate industry to achieve high-quality development, so real estate enterprises should seize the development opportunities of green bonds to provide strong support for the company's value growth and sustainable development.

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