

# ***ARE RETAIL INVESTORS WILLING TO BUY GREEN BONDS? A CASE OF JAPAN***

Kentaka Aruga, Saitama University, +81-48-858-3336, kentaka.aruga@gmail.com

## **Overview**

Studies have suggested that the volatility of green bonds (GBs) tends to be lower than that of existing bonds and that some investors are even willing to pay a premium for GBs because they are often less risky financial assets than the existing bonds (Zerbib, 2019; Nanayakkara and Colombage, 2019). Such investment premium where GB is traded at higher prices than regular bonds or sold with the lower interest rate to the investors is now known as “Greenium.” On the other hand, other studies suggest that no such premium sustains for green bond and whether there is a greenium remains inconclusive among previous studies. These previous studies test for the existence of greenium by analyzing the difference in prices between conventional and green bonds using data from the existing bond markets (MacAskill et al., 2021). Among few existing studies that perform a survey to identify the individual’s perception toward GB, Sandgiorgi and Schopohl (2021) find that issuers of GB see the benefit of GB issuance due to higher levels of investor demand generated from GB. However, at the moment there are very few studies that investigate the perceptions on GB from the buyers’ perspective.

To shed light on this issue, this study is expected to be the first study to analyze investors’ willingness to purchase green bonds. For this purpose, the study applies the contingent valuation method (CVM) to estimate the investor’s willingness to pay (WTP) toward a hypothetical GB presented in the survey. Using the obtained survey data, the study also identifies factors that are likely to influence the investor’s WTP toward GBs.

It is pointed out that investors of GBs not only buy them because of their attractiveness as financial assets for hedging risks and gaining yields but also from the perspective of social responsibility. As most GBs are issued to mitigate human-driven environmental pressures, it could be that the investors are hoping to contribute to environmental issues through investing in GBs. It is known that individuals that are behaving altruistically in their ordinary life are more likely to show an interest in environmental problems (Aruga, 2020). Thus, this study particularly investigates if investors’ differences in their degree of altruism and environmental awareness have impacts on their WTP toward GBs expecting that individuals with higher altruism and environmental awareness levels have a larger WTP toward GB.

Up until now, not much has been studied to understand the investor’s perceptions on GB, and we believe estimating the investors’ WTP toward GB and identifying the factors affecting it will provide important information for financial institutions and governments that are trying to promote and utilize GBs to reduce greenhouse gas emissions. Furthermore, the study could help increase the opportunities for energy companies seeking funds for developing renewable energy facilities to obtain funds for their projects through GBs.

## **Methods**

Since the issuance of the first GB by the World Bank in 2008, Japan has been one of the leading countries for GB issuance in Asia. Furthermore, the issuance of GB in Japan is recently growing dramatically. Thus the Japanese residents were used as the survey sample in this study. The double-bounded contingent valuation (DBCVM) method was used to identify the investors’ WTP toward GB. As Japan’s all top five prefectures whose average income is above the national average locates in the three major metropolitan areas (MHLW, 2022), the survey was performed on the residents of these metropolitan areas. Initially, a screening survey was conducted to only pick individuals living in these areas and those having interests in investing.

The initial bids were offered as interest rates obtained from investing in the GB. These interest rates are assumed to be the annual percentage yield of the GB and they were presented in percentages taking 0.6%, 0.8%, 1.0%, 1.2%, and 1.4%. Since the DBCVM method requires to contain an equal number of samples for the initial bids, we used a stratified random sampling method to obtain 300 samples for these

five initial bids. To have the ratio of ages of the sample respondents in the initial bid groups to be consistent, the bid groups were stratified by age 20-40, 40-50, and 50 or over. After sampling in this way, the ratio of these age tiers contained one-third of each within the five initial bid groups. The initial sample data contained 1,500 samples but since the study was interested in testing how income levels have impacts on the WTP toward GB, we dropped those samples who were not willing to disclose their income levels. Hence, the number of valid respondents ended up totaling 1,346.

The WTP toward GB was estimated by the maximum likelihood estimation. To identify the effects of factors affecting the willingness to buy (WTB) GBs when the respondents faced the bids in each round, we applied the following logit model:

$$\ln \frac{P_i}{1 - P_i} = \beta_0 + \beta_1 Bid_i + \sum_k \gamma_k X_k \quad (i = 1, 2) \quad (1)$$

where  $P_i$  is the probability of answering “yes” to the bids, and  $Bid_i$  is the amount of bids presented in the first and second rounds of the CVM survey.  $X_k$  contains the explanatory variables tested for their effects on the WTB. The explanatory variables included in the model are the average of the Japanese version of the self-reported altruism scale (SRAS) developed by Aruga (2020), environmental awareness indices, gender, age, education, income, knowledge level regarding GB, and the frequency of investing.

## Results and conclusions

To evaluate the investor’s WTP toward GB and to identify factors that influence the WTP, the study conducted a CVM survey on Japanese retail investors who resides in the three major metropolitan areas of Japan. Based on a double-bounded dichotomous choice CVM estimation, the study found that the sample respondents are willing to purchase for GB when the annual return rate is around 1%. According to Green Finance Portal (2022), an institute providing information for the situation of Japanese GB managed by the Ministry of Environment Government of Japan, most of the dollar-denominated GBs issued by Japanese financial institutions provide GB with an above 1% interest rate. Hence, our estimation based on the CVM shows that the average survey respondent’s WTP toward GB was a similar or lower level of returns compared to many of the currently issued GBs in Japan.

The study also revealed that investors with a high altruism level and interests in environmental problems tend to have a higher WTP toward GB. The results for testing these factors on the probability of buying GB also turned out to be positive indicating that the investor’s WTP toward GB is affected by their awareness of social responsibility. This suggests the importance of financial institutions selling GB to provide the retail investors information about how much the GB can contribute to reducing environmental pressure and how it can lead to help the society to cope with environmental problems. Furthermore, the study results showed that investors who have heard of the word GB had a higher WTP, implying that the government and financial institutions need to advertise and spread more information about GB.

## References

- Aruga, K. (2020) Is environmental awareness a good predictor of an individual’s altruism level? *Sustainability* 12(19): 7929.
- Green Finance Portal (2022) *Domestic Issuance List*.  
[http://greenfinanceportal.env.go.jp/en/bond/issuance\\_data/issuance\\_list.html](http://greenfinanceportal.env.go.jp/en/bond/issuance_data/issuance_list.html).
- MacAskill, S., Roca, E., Liu, B., Stewart, R.A., and Sahin, O. (2021) Is there a green premium in the green bond market? Systematic literature review revealing premium determinants. *Journal of Cleaner Production* 280: 124491.
- Ministry of Health, Labour and Welfare (MHLW) (2022) *2020 Basic Survey on Wage Structure*.  
[https://www.mhlw.go.jp/toukei/list/chinginkouzou\\_a.html](https://www.mhlw.go.jp/toukei/list/chinginkouzou_a.html).
- Nanayakkara, M, Colombage, S. (2019) Do investors in Green Bond market pay a premium? Global evidence. *Applied Economics* 51:4425-4437.
- Sandgiorgi, I., and Schopohl, L. (2021) Explaining green bond issuance using survey evidence: beyond the greenium. *The British Accounting Review* (forthcoming).
- Zerbib, O.D. (2019) The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance* 98: 39-60.