Determinants of the Green Bond Premium: A Systematic Analysis

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Abstract. At the same time, the United Nations and the Paris Agreement were adopted in 2015, and thus the green bond market has also expanded. However, its advantage in financing costs and the green premium have been relatively unstable across markets and over time. Systematically review the literature on green premium published from 2020 to 2026 in this paper. Semantic Synthesis will be employed to integrate all relevant materials that can be found in the following three areas: occurrence, underlying reasons, and geographical variations. According to the above analysis, the size and statistical significance of the green premium are affected by various factors such as the time, area of the market and other issues. Third-party verification and data releases are relatively strong stimuli, but they are only effective in the presence of strong regulation and punishment. The lack of a strong "greenium" in China is due to implicit government guarantees and greenwashing in the voluntary certification system. Given the above conditions, this paper believes that the green premium is driven by the joint action of certification credibility, policy intervention strength and investor trust. Based on the above studies, a joint certification system for green bonds and enhanced regular disclosures will need to be introduced at the policy level.

Keywords: Green Bond, Green Premium, Green Finance.

1 Introduction

The trend of the digital age has drawn the public's attention, and at the same time, green finance has also been developing. After the signing of the Paris Agreement in 2015, there has been more talk in the world's green bond market about green bonds. However, this expansion has also been accompanied by abnormality. The financing cost advantage of green bonds and the green premium differ significantly with time and in different markets; thus, they are not stable characteristics.

Studies have found that negative green premiums are relatively common in the European and US markets, but the evidence in the Chinese market is inconsistent; sometimes it is even positive. Oddly enough, a study across multiple countries has also found a narrowing premium in recent years [1]. The above phenomena all point to the same conclusion: a green premium is not an inherent quality of the product, but rather the result of certain institutional and market environments.

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The above three categories are presented in the current study. The first is the third-party verification and public disclosure of information that are expected to improve the confidence of investors [2,3]. The second is the features of the issuer; it may reduce the signaling effect of the green label and, in some cases, replace it [4]. The third is the effect of macroeconomic policies and changes in investor sentiment, such as central banks' purchases of green assets and climate policy uncertainties affecting risk premia [5]. However, these parts are not well integrated, and the main problem of whether certification is effective has not been resolved.

Two studies were published in China at nearly the same time, and they drew different conclusions. Sun and Hao believe that the third-party environmental protection services may not deliver the expected environmental benefits and could thus lead to a shift in research and development strategy [6]. Xing and Wu found that although certification promoted green innovation, it did not reduce the credit spread significantly [7]. The above discrepancy indicates that institutional variables, such as implicit government guarantees and the stringency of certification, have been neglected by scholars in recent years [8].

Systematically review the empirical research on the green premium published from 2020 to 2026 in this paper. First, to organise cross-country evidence on the scope and scale of the premium. Second, identify the four types of drivers (certification, disclosure, issuer characteristics, policy, and sentiment) and determine the boundary conditions under which each factor takes effect. Third, focus on the conflicting evidence from the Chinese market and its institutional causes. Together, the above evidence suggests that the green premium is not universal. The three reasons for the above reasons are the reliability of the rating agencies, the amount of government subsidies, and market confidence. Third-party inspections are not feasible everywhere, and only in areas with stricter regulations and better law enforcement can they be relied upon. The relatively small premium in China is probably because of weaker market incentives provided by the government and a voluntary certification system that may permit greenwashing. The above analyses can address the inconsistencies among different results from cross-country studies and offer an all-around system for comprehending the conditional characteristics of the green premium.

2 Existence and Magnitude of the Green Premium

Review the empirical evidence for the existence and size of the green premium based on various research methods in this section, compare the strengths and weaknesses of each approach, and identify regional and time-varying heterogeneity.

Zerbib finds a negative green premium in euro and US dollar green bonds by a matching method [9]. Caramichael and Rapp have expanded the sample globally and found a similar premium [10]. The advantage of the matching method is that it is logically clear; that is to say, if one can find bonds that are like green bonds in most respects, then the effect of the green label can be recognised relatively easily. The problem is that near-perfect counterpart bonds are seldom available in practice. Zerbib only matched a small number of bonds, and thus his conclusions were not generalisable.

Caramichael and Rapp's sample is much larger, but they admit that the credit ratings of the matched green bonds are significantly higher; thus, some of the premium may be due to the rating advantage rather than the green label itself.

Later studies started to use panel regression or fixed-effects models and added more variables in the control set to obtain more stable estimates. This way is not perfect either [4, 11]. The Results are affected by the functional form and variable selection. For example, Pietsch and Salakhova first found a considerable premium for euro-area data, but this amount dropped significantly after adding a liquidity variable; thus, the liquidity effect may have been erroneously attributed to the green label [4]. Liu and Hu have attempted a meta-analysis to integrate dozens of studies, but the quality of a meta-analysis depends on the quality of the included studies [11]. They believe that the results of these studies are all different and thus difficult to combine. The supporting evidence in China is also rather complicated. Sheng and Montgomery found that there is a relatively large premium for green bonds issued by banks, and Chan found that the private-sector green premium has approached zero [12,13].

A green premium is not an intrinsic quality of a product, but rather changes in a given market over time due to various external changes in the market. The differences among the methods and samples are relatively large, so future research should be more judicious in its choice of research methods.

3 Drivers of the Green Premium

This part introduces three kinds of sources for the green premium based on previous research: certification and information disclosure, issuer attributes, and macro-level policies and investor psychology. It is also unclear whether the reasons and their extent are complete.

Most of the reasons are limited to certification and information disclosure [8,14]. Fornari et al. proposed a "two-tier pricing" model and thought that the green label would attract higher demand, thus increasing the premium for high-environmental-score issuers even further [14]. This conclusion seems reasonable, but most of the data are from Europe, and most of the bonds were rated by the same certification agency; it is unknown whether the results can be generalised to other markets. Wang conducted a similar study in China and found that certification did reduce financing costs; however, she also indicated that China's green bond market has been heavily supported by policy support, and therefore the premium may be more due to fiscal policy than to investors' voluntary demand for green bonds [8]. Although this study has not separated the effects of policies from those of certification, it still do not know whether certification can be implemented without subsidies.

Another group of studies focuses on issuer attributes [10,15]. The above studies have found that large enterprises, highly rated credit issuers, and those in developed countries are more likely to receive a premium; small and medium-sized enterprises, as well as issuers from emerging economies, generally enjoy a much lower premium. At the same time, they also show that the green label of a high-credit-risk bond is more likely to be overshadowed by its risk characteristics. Most of the above studies are only descriptive

in nature or use simple subgroup regression; therefore, an in-depth investigation of the causal mechanism has not been conducted. For example, Ayaydın Hacıömeroğlu et al. observed a relatively large premium in the US municipal bond market, but they also noted that the investor structure of the municipal bond market is mainly retail investors, which differs from that in the corporate bond market; therefore, the pricing mechanism may not be universally applicable [15].

A third line of research is on macro-policies and investor sentiment [3, 4]. Kim and others have found that after the issuance of sovereign green bonds, the credit spreads for corporate green bonds have fallen, indicating a spill-over effect of policy signals [3]. However, the data from the eight Asian markets have been collected for a short period, and it is difficult to determine whether this is a short-term shift in sentiment or a long-term structural problem. Pietsch and Salakhova have found a correlation between the demand for retail investors and fluctuations in the premium, but this is not causation [4]. In 2020, due to the spread of the pandemic, many retail investors purchased green bonds; however, it has not been determined whether their reason was ecological concern or other factors such as low returns on other investments.

Certification and information disclosure are currently the general explanations for this, but they are only effective under specific conditions. Issuer characteristics and macro policies are also correlated with premium; however, most of the existing research has only shown a correlation and has not established a causal link.

4 Regional Differences and Time Dynamics

Compare the performance of green premiums in the Asia-Pacific, Europe and China regions in this section, examine how institutional environments affect the existence and scale of these premiums, and discuss changes and problems that have arisen over time due to fluctuations in premiums.

Comparing different areas, even with the same green label, the price in some places is still relatively high. Green bonds in the Asia-Pacific market have shown relatively lower volatility and higher premium magnitudes, whereas the premium in the European market appears to be in line with policy cycles [16]. In China, the situation is also different; according to research, most of the price premium is supported by government-promoted labels, such as fiscal subsidies and tax incentives, rather than by voluntary green behavior of investors [17]. This is different from the "preference-driven" model in the West, and it may be that institutions are a key reason for the lack of a green premium.

Research on the Dynamics of Time is also lacking. Bachmann and Jespersen employed a pooled cross-sectional regression analysis on a large cross-country dataset to find that the green premium has declined steadily over time from a relatively high level and has recently become positive, although it is no longer statistically significant [5]. Therefore, scholars have had to re-examine whether the green premium can be sustained. However, the method is not perfect either. Pooled cross-sectional regression treats bonds from different years as independent observations and fails to account for fixed effects that may arise from the same issuer issuing bonds multiple times. If the

newly issued bonds have a general decline in credit quality, and the issuers of the earlier high-premium bonds do not issue new ones, then the "disappearance" of the premium may be due to a change in the composition of the sample, and not a qualitative shift in the market pricing mechanism. The two are not divided into primary and secondary markets in this study. The increase in the scale of new share offerings over the past few years, combined with a drop in the average credit rating, may have reduced the overall discount; thus, an increase in this factor would not necessarily be classified as "market maturity".

The variations in the above areas may be attributed to differences in their institutional environments, and a time shift in the premium is likely to reflect changes in the market rather than a failure of the mechanism. Future research should control sample composition and fixed effects more precisely.

5 Overall Evaluation and Future Directions

This section is based on the analysis in the three previous sections. The three main deficiencies of the current research on the green premium are: heterogeneous methods, weak theoretical support and inadequate policy recommendations. It also proposes the direction of the following study.

First, there are many different methods in the studies, so the results cannot be directly compared. Different choices of the sample period, matching methods, inclusion of liquidity adjustments, whether to consider primary or secondary markets, etc., will all lead to different results even if the raw data are the same. The field needs more method-comparison research at present, rather than accumulating more data.

Second, the theoretical basis does not support the results. Many studies have been conducted to explore whether certification is associated with higher risk premiums; however, the underlying reason for this increase in perceived risk is not yet clear. Bring in the micro foundations of signaling theory and institutional theory to help construct more testable hypotheses.

Thirdly, the translation of research results into policies has been too prompt at times. Some papers conduct regressions and then directly call for "stronger certification" or "unified disclosure rules" without differentiating the applicability of policy tools under various institutional environments. For example, given that China is a policy-oriented market, a compulsory disclosure system is more appropriate than the option of optional certification; at the same time, third-party reputation systems are generally more economical in Europe and the United States compared with direct government intervention.

In the future, research on the green premium will need to build more advanced testing and causal identification mechanisms and carry out stricter causal identification. In addition to the mean premium, the actual distribution of premiums can also be shown in a histogram or other plots for different subgroups, such as credit ratings, industries and types of institutions, and so on. At the same time, external shocks can be used to construct quasi-natural experiments (e.g., cross-border issuances, policy changes, or greenwashing scandals), and confounding factors can be controlled for to enhance the

degree of causal inference; Abis et al. have employed a twin-bond model in the German treasury bond market for this purpose [2].

Only by jointly advancing research methods, theories and policies will the study of the green premium provide a reliable basis for the construction of green finance policies.

6 Conclusion

Systematically examine the empirical research on the green bond premium published from 2020 to 2026 in this paper. The first three are as follows.

First, although a green premium does exist, its scale and statistical significance vary depending on the sample period, market area and other factors of the study. The results of the studies are quite different and have shown a downward trend recently. It is not that the green label has become less effective; rather, the market has been developing over time. An increase in supply, greater openness, and a rise in overall interest rates have all reduced the original shortage premium.

Second, third-party certification and information disclosure are the most effective drivers of the premium. However, they are not universally effective. Certification is only feasible in a high-regulation area with severe penalties. A voluntary certification system allows businesses to achieve favorable public images and do not necessarily commit to genuine changes in the environment; some may have increased R&D and other investments unreasonably.

Third, issuer characteristics and macro policies also influence the premium, but most of the existing studies are limited to showing a correlation and lack in-depth causal analysis. Specific features of the Chinese market, such as implicit government guarantees that lower the interest-rate floor and a voluntary certification system making it relatively easy to obtain a green label, have reduced the additional pricing space for green labels.

This study has the following deficiencies. The empirical studies listed here have different methods; due to variations in matching techniques, model specifications and other reasons, they cannot be directly compared. Therefore, this paper did not perform a quantitative meta-analysis. In addition, as a review of related studies, this paper has not conducted original empirical research, and thus its results are limited by existing studies.

Research on the green premium has moved away from whether it exists to how and why it occurs, as well as when and why it disappears. This change in research has direct implications for green finance policy. If the green label is to have genuine financial benefits, it should not be based solely on labelling; strong regulations, genuine disclosure, and enforceable accountability must all be in place. In the future, some research may investigate quasi-natural experiments more deeply, quantify institutional factors in cross-country comparisons, and study the impact of secondary market responses and greenwashing incidents.

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