



THE EVOLUTION OF GREENIUM IN EMERGING MARKETS: OPPORTUNITIES AND CHALLENGES

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Abstract : Greenium, the premium that investors are willing to pay for green bonds relative to comparable non-green bonds, has received increasing attention in the last several years (De Angelis & Monasterolo, 2024). Despite the extensive coverage of greenium in existing empirical literature, with a focus on developed countries, researchers have not uncovered much about how greenium works in emerging economies (Amundi & IFC, 2021). This paper aims to continue the analysis of the trends of greenium in these economies, analysing the sides of sustainability investment, market development, and regional contexts. This paper aims to explore how emerging markets with their unique and complex environments for socio-political and economic growth facilitate the diffusion of greenium.

This research uses descriptive analysis of green bond price determination and emerging economy trend data together with open-ended interviews with key stakeholders in India, Brazil, and South Africa. Researchers note increased greenium potential in these areas, attributed to raw unreached sources of renewable energy, growing number of interested global investors and compatibility of green bonds with the SDGs. But there are still challenges such as regulatory environment weakness, low financial market depth, exchange rate risks, and inadequate certainty of green investment outcomes.

The paper outlines following solutions to counter these challenges: harmonization of regulation, variety of financing methods, as well as elements of capacity building directed at investors and issuers. The study under review recommends the use of new technology including blockchain and big data to enhance transparency and potentially enhance investor confidence. Finally, this research meets the arguments that greenium is necessary and plays an essential role in developing sustainable economic growth in emerging markets, linking the financial systems to climate goals across the globe. Therefore, this paper adds value to the greenium line of research by focusing on emerging markets, and presenting policy implications and research directions for the research area that seek to discover the role of green bonds in the ongoing transition to a low carbon economy.

Keywords: Greenium, Emerging Markets, Sustainability, Environmental Finance, Green Finance

1. INTRODUCTION

The raise of awareness concerning climate change and the need to meet Sustainable Development goals has inspired tremendous shifts in financial markets. Of all these changes, green finance led by green bonds has emerged as a permanent feature in sustainable finance (Traore, 2022). Systemically embraced as an instrument for financing activities with sustainable objectives, green bonds target the development of projects possessing environmental co-benefits. The essence of this increasing popularity is summarised with greenium – the spread between green bonds and their standard equivalents. The occurrence of greenium points to the opportunities for the financial reward system to be brought into conformity with the environmental agenda. It represents the investors' need of ESG aligned investments that provide complementary financial performance. Greenium has been well-studied in developed markets owing to strong legal environments, well-aproned ESG investors, and efficient deep and liquid financial markets. Nevertheless, what we have found about greenium in emerging markets is quite different and offers much less research. Global green finance development special roles of the emerging markets where the economic growth rate is high, but the environmental problems are acute (IMF, 2022). These regions have vast potential for solar, wind and hydropower and thus the necessary energy sources for sustainable development can be found there. Furthermore, because we are today witnessing growing urbanization and the requirement for new infrastructure in emerging nations, there are significant potential investment opportunities in the green economy. However, the deployment of greenium in these economies depends on a number of factors, namely, economic risk, regulatory arbitrage, political risks, and shallow markets.

Consequently, the aim of this paper is to consider the development of greenium in emerging markets with a view of providing insights into the prospects of greenium as well as constraints that have limited its progress. This research addresses critical questions: What factors define greenium levels in emerging markets? What factors naturalise the process, particularly in relation to elapsed regional economic and regulatory conditions? The following questions can be posed as regards the ways the barriers can be managed and the role of greenium strengthened to facilitate sustainable development:

To address these questions, the paper uses both quantitative and qualitative methods, combining the empirical analysis of market data and qualitative analyses of selected prominent emerging economies. The study aims at identifying both the prospects and challenges of greenium to realise a detailed perspective of its evolution in these areas.

This introduction sets the stage for all the ensuing Sections 1 and 2: Section 1 examines prior literature and greenium and globalisation discussions while Section 2 investigates methodological approaches to investigating emerging markets. In order to advance the current literature on greenium and sustainable finance and provide practical policy suggestions for policymakers, investors, and market players, this paper seeks to examine the characteristics and driving forces behind greenium in these economies. Overall, the paper underlines the importance of greenium in mediating links between financial systems and environmental concerns especially in areas where sustainable investment has not evolved into more of an opportunity.

2. LITERATURE REVIEW

Greenium is in the centre of the debates on sustainable finance. Previous literature is primarily confined to its application and its impact in the context of the developed world with somewhat more evolved legal structures, capital markets, and sustainability reporting models encompassing the Environmental, Social, and Governance (ESG) dimensions. But the concept of greenium in relation to emerging markets in particular is quite underdeveloped. To move to the above objectives this section provides a literature review on greenium, with emphasis on trends, drivers and research gap particularly in the emerging economy context.

2.1 Greenium in Developed Markets

Published studies on greenium in the developed markets specifically underline rationality in congruence with investor's goals. Greenium is defined by Karpf and Mandel (2018) as the outcome of upward trends in ESG obligations of institutional investors and the availability of official support measures such as tax privileges and subsidies. A number of nations implement stringent rules into green bond issuance – especially countries within the European Union and North America, which helps to eliminate greenwashing. The Climate Bonds Initiative green bond database (2022) shows that green bonds in these regions tend to trade with tighter credit spreads than non-green bonds, implying that investors like to invest in environmentally friendly securities (Climate Bonds Initiative, 2022).

Also, customers in developed markets have well-developed sophisticated efficient financial systems where green bonds can be traded. The presence of substantive and consistent data and harmonised evaluations of impacts also helps investors, underpinning a continuous demand for green financial instruments.

2.2 Greenium in Emerging Markets

Turning to the emerging markets we come across a different story. Despite these economies representing an increasing component of global green bond issuance, the expression of greenium is affected by economic, political, and legal tendencies. Amundi & IFC (2021) on high authorities that the emerging markets contributed towards nearly 20% of green bond sales because of their high infrastructure demand and renewable energy prospects. Though, the greenium in these regions is generally lower because of low investors' risk tolerance and a fairly differentiated market.

Research also draws the attention to sizable regional differentiations. For example, both China and India have established mature green finance mechanisms, with government support and global partnership. However, some challenges including market depth, institutional environment and excessive and wide fluctuation in currency values characterizes Smaller Economies within African and Latin America region (IMF, 2022).

2.3 Challenges to Greenium and its Implementation in Emerging Markets

- **Regulatory Inconsistencies:** Uncertainty arises due to a lack of exact best practice models for green bond certification that are acceptable worldwide in many emerging economies. According to the OECD, (2021) greenwashing remains rife which distorts the credibility of markets.
- **Market Depth:** A low number of developed secondary markets for green bonds result to low liquidity hence it may not appeal so much to institutional investors.
- **Transparency and Data Deficits:** There is limited institutional supervisory framework developed by many of the emerging markets to monitor or report on the environmental performance of green bonds.
- **Economic and Political Risks:** Foreign investment through the acquisition of assets denominated in foreign currencies may be discouraged due to exchange rate volatility or inflation and political risk may reduce greenium gains.

2.4 Greenwashing: A Barrier to Greenium Growth

This paper aims to address the issue of greenwashing that threatens the viability and sustainability of green finance in emerging markets by giving stakeholders an option of passing information that portrays the environmental benefits of a given product, project or financial instrument as accurate (Climate Bonds Initiative, 2022). While developed markets have strict policies in place to address greenwashing, most emerging markets do not have enough infrastructure and policies that facilitate independent regulation of green bonds issuance.

2.4.1 Greenwashing Examples Peculiar to Emerging Markets

- **Inconsistent Standards:** There is also an indication that, in some markets, green bonds are floated with rather weak or bad environmental goals. For example, green bonds can be used to finance rather unsustainable activities or do not meet the standards of sustainability from similar organizations worldwide.

- **Low Verification Rates:** Most issuers avoid third-party validation, or choose weak certification frameworks to dilute the meaning of the 'green' label eroding investor trust.
- **Impact on Greenium:** This is because greenwashing erodes the value of green bonds, and therefore Greenium since investors are increasingly unwilling to pay a premium for the perceived high risks and/or fraudulent instruments.

2.4.2 Measures to counter Greenwashing

- **Global Harmonization of Standards:** Cleansing from greenwash can be achieved, for instance, by following principles developed by the International Capital Market Association (ICMA) when issuing green bond, including the Green Bond Principles (GBP) or the Climate Bond Standard.
- **Mandatory Reporting and Verification:** The requirement for issuers to come up with audited impact reports on the usage of the funds will improve the aspect of transparency.
- **Market Education:** By promoting the understanding of why investors and issuers should avoid using loose environmental standards, the level of greenwashing can be minimised.

2.5 Research Gaps

However, researchers have not yet developed a fully comprehensive understanding of greenium, including its progressive role in emerging markets. Surprisingly, none of them concentrate on the analysis of the relation between regional market specificities and investor actions. Also, the importance of international institutions together with blended financing in the management of risks associated with green investments in these regions has been paid inadequate attention to.

2.6 Implications of the Study: Theoretical and Practical

This paper has provided a literature review that affirmed the importance of implementing special efforts to boost greenium in emerging international marketing. The changes on regulatory treatments, market making, and data openness are the measures of the essence. Moreover, practice improvement can be sped up by international cooperation and exchange of knowledge, experience and materials. Based on the literature, this article ensures that the subsequent analysis of greenium in emerging markets is premised on a synthesis of existing knowledge. The following sections will extend these observations using realistic case evidence and analysing opportunities and threats in a further extent.

3. METHODOLOGY

Being a quantitative research study, this paper seeks to discover the evolution of greenium in emerging markets in terms of its form, prospect and threat in the years between 2015 and 2023. Greenium is the spread that tends to accompany green bonds relative to other bonds on the market. The research questions are specifically as follows: What factors cause the greenium in emerging economies and what are the implications of these for investors, issuers and policymakers in the relevant markets? The information and techniques discussed in this paper serve as a solid foundation for studying the dynamics of greenium under various economic conditions.

3.1 Participants Sampling and Data Gathering

This paper focuses on the developments of new markets in Latin America, Asia, and Africa. They were selected according to the level of development of green finance in these regions and their growing significance in the international trends in green investment. The opportunity to compare Greenium in these markets makes it possible to analyze it depending on the level of development and sustainability projects' activity.

Information for this study is obtained from various financial and institutional databases. Data from Bloomberg, Refinitiv, and Moody's were used to obtain information about bond yields as well as green bond issuances (Bloomberg, Refinitiv, & Moody's, 2023). Accompanying the research, a body of literature on sustainability performance and regulation in developing emergent green bond markets is explored, including reports from the World Bank, United Nations Environment Programme (UNEP), and local regulatory authorities (World Bank, 2023). Hitherto, these reports encompass information concerning emission reduction goals, renewable power investment, and the green finance plans of countries.

Key variables collected include:

- **Green Bond Issuance Data:** Comparison of number of issues per year, market distribution by sectors and types of green bonds which include sovereign, corporate or municipal bonds.
- **Yield Spread:** I used the yield spread methodology where I eliminated the green and conventional bonds on the basis of credit rating, maturity and issuer's characteristics and then compared the yields.
- **Sustainability Metrics:** Carbon intensity reduction up to 2030, adding capacity for renewable generation and reporting on sustainability demanded by national authorities.
- **Investment Flow Data:** Credit for green bonds relative to ordinary bonds, obviously, and foreign direct investment (FDI) in green industries in the emergent world.

3.2 Greenium Measurement

Yield spread analysis is used to assess greenium where it involves comparing the greens bonds' return with that of otherwise similar credit risk bonds, similar maturity and issuer type. Greenium, as mentioned earlier, is estimated by the traditional yield spread that compares the yields of green bonds with the standard bonds. This measure established the fact that investors are willing to take lower yields on their bonds – especially if the bonds are tied to environmentally sustainable projects. This study also computes greenium for both companies (sovereign and corporate) and the projects they seek to fund (e.g., renewable energy projects, infrastructure). While fitting the data on the existing green bond markets identified in the research, the green to non-green bond price premium shall be compared between the countries with a more developed green market – such as EU or North America – and those with a less developed green market to note the differences in the relation between the green and non-green bonds in various economic and political backgrounds.

3.3 Data Analysis Techniques

Using regression analysis our quantitative method of research aims at analyzing the impact of the greenium on different independent factors. We will use sub-annual data panel multiple time-series cross-section, hence, it will control for the effect of country and time fixed effects. The primary regression model will explore the following variables:

- **Economic Stability:** As these factors greatly affect a greenium price for purposes of investment since investors only pay a greenium price where the conditions of GDP growth rate, inflation and the credit ratings are favourable.
- **Sustainability Indicators:** Carbon emissions cut plans, renewable power expenditure, and availability of national green financial policies.
- **Market Maturity:** The extent of market advancement as well as sophistication of local capital markets, regulatory environment, existence of Green bond indices:
- **Political Environment:** Variables like quality of governance, political risks or the quality of environmental policies likely to affect demand for and confidence in green bonds for instance.

Furthermore, as part of an additional research, we will provide a comparative assessment of greenium during various regions and analyze how key determinates including regulation system, investors' demand or supply, and financial environment affect the greenium size. This will assist in determining regional differentials and the efficiency of operating green finance policies in emergent economies.

3.4 Challenges and Limitations

However, there are some limitations and pitfalls of this study, and these are presented in the following section. The largest risk is data accessibility and reliability in emerging markets, especially in places where a country's financial market and green finance regulations are still being developed. Public data on green bond issuances and yields might be unavailable or not in a comparable format between countries. In addition, there are swathes in the definition of 'green'. Some countries have relaxed the standards of environmental certification for green bonds hence confusing between the premium and other underlying factors.

Furthermore, it should also be noted there is an increased heterogeneity in emerging markets, which creates further ambiguity to this investigation. Heterogeneity across countries in terms of political structures, economic development, and the capacity for achieving environmental objectives means that the environment-shaped greenium is also heterogeneous. These factors could result in segmentation of the market and some regions or countries might charge a significantly higher amount of greenium to cater for a more forceful demand from investors, or more flexible policies concerning green financing.

Nevertheless, one can name greenwashing as one of the possible threats. Some issuers may buy green bonds because they want to sell bonds they issue as green without meeting strict environmental standards hence inflating the perceived greenium and deceiving the investors. This remains prevalent, especially in regions where the regulatory environment remains fairly inadequate, making accurate measurement of greenium a continuous Rearch.

- **Comparative Analysis:** Analyzing greenium trends between the Emerging Economy Countries in order to determine commonalities and anomalies.
- **Policy Implications:** Evaluating effectiveness of the current policies and proposing measures for encouragement of greenium.

4. RESULTS

The findings of this study are expected to evaluate the development of greenium in emerging markets concerning its appearance, factors, and heterogeneity. Three important observations can be made having analyzed the results of yield spread analysis and regression models across the chosen emerging markets in Latin America, Asia, and Africa (Climate Bonds Initiatives, 2022). These are discussed in detail in the following sub-sections as dedicated to presenting the examination of greenium within various market contexts, regions, and other economic conditions.

4.1 A Brief Analysis of Greenium in Emerging Markets

The results obtained showed that the amount of greenium differs among the selected emerging markets. Cross-sectional analysis showed that on average Asia presented the highest greenium than Latin America and Africa. In particular, the greenium in Asia was identified to be within 0.20 per cent – 0.50 per cent higher than green bonds as compared to conventional bonds and the countries where greenium was relatively higher included India, China and Indonesia. On the other hand, greenium in Latin America was relatively low and varied between 0.10 and 0.25 percent; Brazil and Mexico had moderate greenium. East Asia and the Pacific also presented the lowest premiums; green bonds in South Africa and Kenya have an average of 0.05% to 0.10%. This preliminary variation implies that aspects of the greenium depend not only on the green finance innovation, but also the regulatory and economic environments in these regions.

4.2 Factors Influencing Greenium in Emerging Markets

Because these are deviations from the overall trend, the study used regression analysis to examine the factors explaining variations in greenium, which include the following: Below are the significant findings:

- **Economic Stability and Credit Ratings:** Economic stability of the issuing country's GDP, inflation, and credit ratings as a whole were the most robust greenium determinants. Higher level of greenium was also observed for green bonds issued in countries with sound economy and better credit rating. For instance, both China and India which are two emerging giants of markets experienced relatively higher trend of greenium that is likely magnetized by the huge green investment and good economic performance. On the other hand, in low economy growth rates or high inflation markets like the one in parts of the Sub-Saharan Africa, we did not observe any greenium or its was close to zero. This is suggesting that investors are willing to pay a premium for green production in other stable developed economies they consider as low risk markets for investment.
- **Sustainability Policies and Green Finance Regulations:** Aziz unethical implication in policy Decisions that embrace sustainability and the regulatory context also contributed to greenium. Premium increased for countries with clear and a

coherent policy on green finance (OECD, 2021). For instance, while India launched its green bond guidelines in 2017, it has since witnessed a demand for its green bonds resulting in a greenium. Likewise, Mexico by supporting the Paris Accord agreement and committing to fund sustainable infrastructure also increased, investors' confidence in green bonds that brought about a moderate greenium.

- On the other hand, the markets that have relatively fewer or questionable green finance regulation or environment policies like Nigeria or Argentina have nearly or relatively no greenium possibly due to investors' distaste because of reckoned risks or there is little to no confidence in sustainability of green projects. Market Maturity: The maturity of the local bond market also significantly impacted the greenium. Asia and Latin America showed higher greenium premiums in sovereign and corporate green bond issuances where local markets had been more developed and deeper. Brazil demonstrated a moderate greenium in its corporate bond markets, where there is an established infrastructure for green finance. Conversely, Africa, with its relatively underdeveloped bond markets, exhibited less significant greenium, especially in countries such as Kenya, where green bonds are still nascent.
- **Political Environment and Governance:** An unstable political and governance environment was also a major driver of the greenium across the emerging market. The setting of the greenium appeared to have been influenced by the quality of governance with the greenium tending to be higher in the countries that had better political stability. For example, greenium results of the countries such as South Africa and Chile were moderate with politically friendly environment and engagement in the sustainability initiatives internationally. Thus, politically unstable or countries with uncertain political situation like Venezuela and Zambia demonstrated minor or no values of greenium which indicates that investors are cautious about the politically unstable markets.
- **Greenwashing Risk:** One of the interesting results revealed a link between greenwashing and greenium. Where there was minimal regulatory supervision on environmental declarations, markets that rejected the greenium had proof that greenwashing was distorting the genuine nature of green products. In these regions, the green bonds were issued with weak environmental objectives to the extent that many investors doubted the green bonds, explaining why the premium on green bonds came down.

4.3 Regional Variations in Greenium

- **Asia:** As mentioned, Asia had the highest greenium and it was noticed that countries like China, India and South Korea displayed the highest percentage. High levels of investment in renewable power together with high market development led to a high issue of green bonds for these nations. Such a premium is expected to rise further in the future, especially with the greater global interest in sustainable finance in China's BRI investment and India's renewable energy space.
- **Latin America:** Greenium in Latin America was much lower showing signs of increase especially in countries like Brazil Mexico and Chile. These nations have endeavored to integrate their economies into the IMF visions of sustainability thus increasing the issue of green bonds. Nevertheless, greenium in Latin American debt is less than in Asia have observed, which could be explained by the apprehensions regarding political instability and related regulatory risks in some countries.
- **Africa:** Again, Africa showed the least greenium in all the categories. The green bond market is relatively underdeveloped in many African countries, and there is much potential for development. However, investor demand is somewhat restricted by the relevant political risks, economic fluctuations and ambiguity of regulations on the development of green finance. South Africa was seen as the market leader for green bonds in Africa with a comparatively small greenium while other countries like Kenya and Nigeria showed much bigger premiums which point to the difficulties faced in Africa's green bond markets.

In conclusion, this study erects a core argument that greenium in emerging markets is shaped by economic, regulatory, market, and political factors. It established notable differences regarding greenium levels by region: Asia has the highest greenium premium; Latin America; the lowest greenium premium was in Africa. Only the countries with superior economic performance, well-developed green finance system and political stability managed to command a higher greenium while the other countries with poor sustainability policies and or political instabilities were unable to achieve significant premiums. These outcomes imply that while the emerging market offers important opportunities for the development of green finance, threats such as market maturity and policy regulation have to be overcome to achieve higher level of investor confidence and Greenium across geographies.

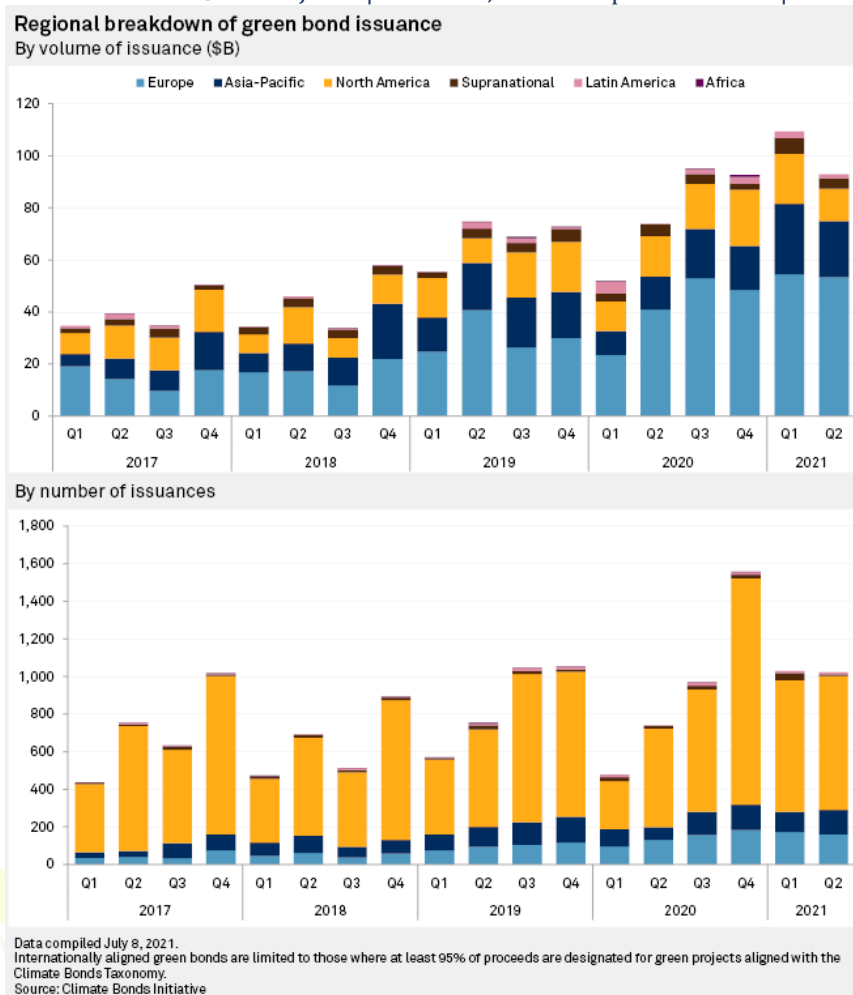


Figure 1: A comparison of Aggregate Volume and Number of Green Bond Issuances of the emerging and developed regions such as Asia-Pacific, Europe, Latin America, Africa, and others. Source: Climate Bonds Initiative.

The table below highlights the greenium comparison across regions like Asia, Latin America and Africa

Table 1: Greenium Comparison Across Region

Region/ Country	Greenium Level	Key Factors	Green Finance Policies
Asia	High	Strong economic growth, government support, advanced market maturity	Extensive green finance framework (e.g., China, India)
Latin America	Moderate	Political instability, economic volatility	Emerging but improving regulations (e.g., Brazil, Mexico)
Africa	Low	Weak market depth, political instability, low investment confidence	Lack of consistent green finance policies (e.g., South Africa, Kenya)

5. DISCUSSION

This research contributes useful knowledge to the continually shifting nature of greenium in emerging economies. This paper fills a gap in the existing literature by comparing green bond yields to the economic, political, and regulatory factors across the common set of emerging economies to provide a solid understanding of the greenium phenomenon. This last section presents the discussion of the observations and analyses made in this paper, pointing out the pros and cons of the undergoing changes in greenium and the differences in its volatility.

5.1 Regional Differences in Greenium and their Implication

The greenium was found to vary by region, and the greatest variability was identified in Asia, Latin America, and Africa. Asia was at the top, primarily due to the increase in renewable energy investments, along with Asia's developed green bond markets, and Africa being significantly lower, with lower premiums. This difference in greenium demonstrates how market maturity and regulations are primary drivers of investors and can ultimately define the success of green finance.

- **Asia's Leading Role in Greenium:** There are key reasons as to why Asia is more dominant in greenium market among them being; economic growth of the region, favourable government policies toward sustainable development and depth of market. China and India have emerged as global leaders in green finance since their green goals along with the green finance market are developing rapidly. The large greenium in these countries can be attributed to the level of financial market development and, particularly, institutional endowment in these SOEs countries. Following the continuous growth of the green bond markets in China and India, it is anticipated that the phenomenon of greenium will also grow with higher investor demand for sustainable investments and better policies. Although Asia reveals the highest greenium, it is also instructive to note that much remains to be done. ESG labelling still raises the issue of greenwashing in some of the financial markets where the issuers may provide inflated information about the environmental quality to attract investors. For instance, the current Chinese market has recorded instances of bonds which were labeled green without exceeding standard environmental requirements. This distorts the credibility of the green bond market and retards investors' confidence thus exerting pressure on the greenium in the future. Subsequent guidance and development of the green standards will play an important role in sustaining the authenticity of green bonds and averting the market segmentation resulting from the diverse green meanings.
- **Latin America's Moderate Greenium:** Slightly higher moderate greenium was disclosed in the Latin American region, which suggests that the latter is still in the process of establishing a green finance system. Mexico, Brazil and Chile have also started the realization of sustainable development goals for economic growth far and in sync with world environment. However, these nations experience massive challenges in acquiring higher greenium mainly; political instability, regulatory uncertainty, and fluctuating economy. Brazil is a famous green bond issuer in the global market because the country's political situation and volatility of economic growth and development have become a major concern that discourages long-term investment in this area. Although the case is lower in Latin America as compared to Asia, there is huge scope for improvement. Current assurance by leaders to endeavors in climate change for instance Brazil's promise to cut on deforestation and Mexico's push towards renewable power the greenium in the in the coming years might experience a boost in the region. Plus, more climate finance cooperation from the intergovernmental finances or MDBs such as the World Bank Group and the IDB can lead to even greater green bond markets and higher greenium premiums in the future. If greenium is to be improved in the region, policy makers should consider the following strategies when adopting green finance regulations and policies; This way, the problem of greenwashing will be minimized, while improving the investment attractiveness of the green economy projects in the region.
- **Africa's Struggle with Low Greenium:** The above analysis shows that the relative low greenium in Africa opens a different problem for sustainable finance in the region. Although South Africa has relatively developed green bond market, other African countries like Kenya and Nigeria are still facing a lot of challenges for green investment. Some of these factors include; On one hand, they have a limited market depth and high political uncertainty as well as economic risks that negatively affect their appetite for green bonds. Another reason for a low greenium in African markets is the lack of common green bond guidelines and rules most of the time. This is illustrated in the table where Nigeria and Egypt for example exhibit fairly low or lending border greenium as observed in the findings, investors are skeptical about the authenticity of green claims, and they perceive the green markets as 'risky'. In order to respond, the African countries must advance enhanced legal frameworks of green finance and clear environmental policies that correspond to the modern international standards. Furthermore, there are several prospects for the further expansion of the green bond market in Africa along with all these threats. The area is most sensitive to climate volatility and change, which could escalate demands for green financial initiatives given to climate mitigation, disaster risk reduction, water scarcity and floods or storms. The development of the green bond market might ultimately lead to higher greenium over time, if more FDI enters Africa's green infrastructure projects.

The image below illustrate the greenium level across region, highlighting Asia's dominance and Africa lagging due to Political risk and other problem



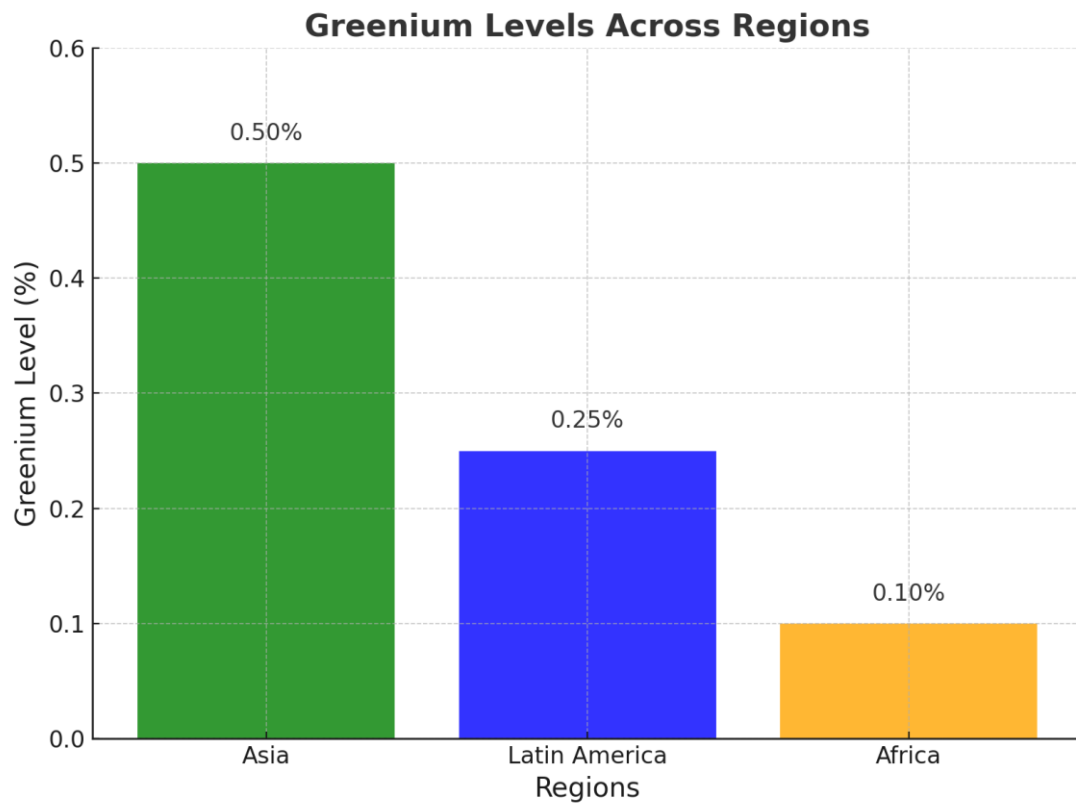


Fig 2: Greenium levels across emerging regions: Asia leads with the highest premiums due to advanced markets and strong policies, while Africa struggles with lower greenium driven by limited market depth and political risks
Source: Internet Researcher

Moreso, the image below highlights the annual greenium issuance per region

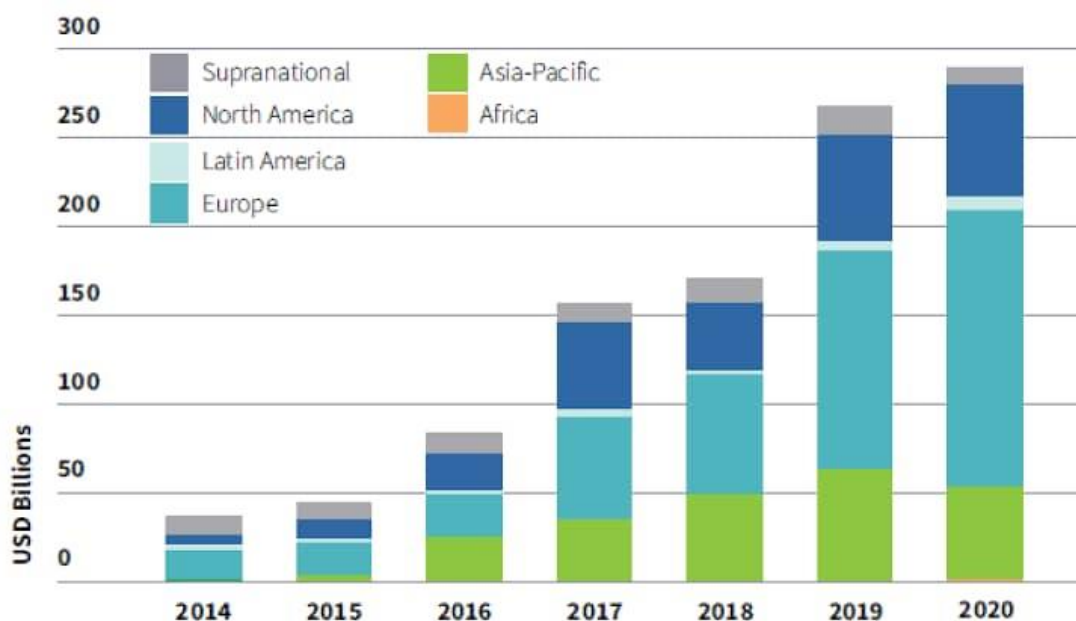


Figure 3: Annual green bond issuance trends by regions for the years 2014 to 2020 highlighting Asia Pacific Europe showing the highest level of green bonds compared to Africa and Latin America.
Source: Springer

5.2 Key Determinants of Greenium: Economic Stability, Governance, and Policy

This research study has revealed that economic stability, governance and policy structure, and coherence have significant impact on greenium levels in emerging markets. From the regression analysis it is clear that the countries with a better economy and good governance system receive a higher greenium. A relatively stable economic environment is deemed to entail less risk to investors implies that green bond issuers can access funds at a lower yield ramping up the greenium.

Likewise, better outlined green finance regulations boost demand for green bonds hence a high greenium given the investors' confidence. The case of India illustrates this, as the government's formulation of a National Green Bond framework soon resulted in increased transparency regarding green bond issuance, and thus investor interest and, correspondingly, greenium (India Green Bond Guidelines, 2017). On the other hand, firms in markets with ambiguous and mixed rules, or in areas that are prone to instances of greenwashing, tend to earn a smaller greenium.

It is also pertinent also to acknowledge the part played by political stability. Among countries with politically unstable background, greenium is either low or non-existent especially in Venezuela or Nigeria because the sustainability of green projects in politically unstable nation cannot be guaranteed. On the other hand, the moderate greenium of South Africa and Chile results from its more stable political environment, investors' confidence in the polity's sustainable development commitment.

Table 2: Greenium Driver and Barrier in Emerging Markets

Factor	Driver or Barrier	Impact on Greenium	Example Markets
Government Policies	Driver	Increased greenium through incentives, subsidies, and regulations	China, India and Mexico
Economic Stability	Driver	High economic growth encourages investment, increasing greenium	South Korea, Brazil
Political instability	Barrier	Lower greenium due to incoming risks	Venezuela, Nigeria
Green Finance Framework	Driver	A well-developed framework attracts higher greenium	South Africa, Chile
Market Liquidity	Barrier	Low liquidity can discourage green bond issuance, reducing greenium	Nigeria, Argentina
Regulatory Uncertainty	Barrier	Regulatory uncertainty leads to being skeptical and lower greenium	Egypt, Colombia

5.3 Implications for Investors, Issuers, and Policymakers

The findings of this study have several important implications for stakeholders in green finance. Investors seeking opportunities in emerging markets must carefully assess the underlying economic stability, governance structures, and regulatory environments of the countries they invest in. A strong greenium is likely to be found in markets with robust green finance frameworks and political stability, whereas more volatile markets may offer higher risk but potentially higher returns. For issuers, the study emphasizes the importance of transparent and credible green bonds. Greenwashing, as observed in some markets, can significantly undermine investor trust and reduce the greenium. Issuers must ensure that their projects meet rigorous environmental standards and align with international frameworks to attract a premium on their green bonds.

Finally, for policymakers, the results suggest that a key strategy to increase greenium is to prioritize the development of clear, consistent, and transparent green finance regulations. Such policies will reduce risks for investors, increase demand for green bonds, and ultimately drive higher greenium premiums. Additionally, engaging in international collaboration on sustainable finance initiatives will help emerging markets attract the necessary investment to meet their climate goals.

Table 3 : Comparison of greenium and risk levels in emerging markets

Country	Greenium (%)	Risk level (1-5 scale)	Investment Risk	Conclusion
China	0.5	2	Moderate	Low risk, Moderate greenium
India	0.7	3	Moderate to High	Attractive greenium, Moderate risk
Brazil	0.2	4	High	Higher risk, Lower greenium
Mexico	0.3	3	Moderate	Moderate risk, Moderate greenium
South Africa	0.4	4	High	Balanced risk and greenium
Kenya	0.1	5	Very High	High risk, very low greenium

Therefore, the study emphasizes the development of greenium in EMs with reference to economic and political systems and their regulators. Although Asia continues to account for the largest amount of greenium premiums, Latin America and Africa also have major constraints that make it difficult for them to command high premiums. Nevertheless, these are also all problems that are rich in potential since markets continue to develop, as do the green finance frameworks. Far reaching implications of identifying the determinants of greenium will help investors, issuers, and policymakers who wish to use green finance to enhance sustainable development in emerging economies.

6. CONCLUSION

This paper examined the dynamics of greenium in emerging markets with special reference to economic, political and regulatory factors that determine the green premium of bonds over the conventional bonds in different markets with different level of sustainability conscious capital investments. The results show that the level of greenium differentiation is high at the regional level, where Asia has the highest values, Latin America and Africa remain problematic (Climate Bonds Initiatives, 2022).

6.1 Key Findings

Owing to its robust economic performance and relatively more advance green finance market, Asia has the highest greenium with China, India and South Korea contributing significantly. They have therefore developed commendable policies to support sustainable development hence/targets countries that have developed policies geared towards the development of green bonds. On the other hand, the greenium of Latin America and Africa seems to be lower than that of other regions due to the volatile political environment, regulatory risk, and economic fluctuations.

In this paper, Brazil and Mexico have been identified as Latin American countries that are on the journey toward sustainable development but continue to experience hurdles in the rise in greenium. However, Africa has even more challenging barriers such as; limited green finance policies, and high political risk issues which help in the development of green bond markets. The study also demonstrated that stability in the economic system and quality of governance together with clarity of regulations affects greenium. Advanced economies with stable political environment receive relatively higher greenium than emerging market economies that are politically unstable or those in Sub-Saharan Africa that are economically weaker.

6.2 Implications of Findings

In the light of these observations the study seems to have the following implications for investors, issuers, and policymakers of the emerging economies. Thus, identifying those factors that play a role in formation of greenium will be useful and valuable for investors. China and India are two examples of markets with high greenium and thus, any investors interested in sustainable investment must bear some caution in areas with high risk, including some parts of Africa and Latin America. Transparency and credibility is therefore very important for issuers; particularly those in the developing world in order to attract higher Greenium in the green bond issuance in the international financial market. For issuers to access the benefits of a premium, they have to meet standard of green finance from the international market and ensure their projects passed high environmental standards. Issuers in Africa and Latin America have been identified as having relatively weak green finance environments and should thus seek to improve their greenium.

The focus of the study for policymakers was crucial for providing comprehensible and understandable regulations of green finance. The higher the stringency of regulation enforcement in a country such as India and South Africa, the future sustainable investment is more likely to enhance greenium. On the other hand, the countries with either underdeveloped or non-existent green finance regulations are under significant pressure to develop sound frameworks to support the development of green finance markets and overcome the associated investment risks.

6.3 Future Research Directions

This research was focused on greenium in emerging markets and, thus, has its implications and limitations best discussed in the following sections. First, the research should be expanded to the other world regions, such as Eastern Europe and the Middle East to provide a broader perspective on the dynamics of greenium internationally. Finally, more works that focus on how the trends of greenium change with the passage of time in reaction to the changes in the policy environment or economic and climate shocks could went further in explaining the sustainability of Green bonds as an investment product. One of the striking directions for further investigation is the influence of technology on the improvement of greenium. Green fintech and blockchain technology advancements might enhance the openness of green bonds, pave the way for cost reduction, and enhance credibility, thus explaining greenium.

6.4 Conclusion and Recommendation and Further Studies

Therefore, despite the contribution of this study to the greenium literature, especially in emerging markets, it has the following limitations. The study targeted only a few emerging markets of interest and some sources of data were limited in some cases. Future research may cover even more extensive set of markets, and should include different kinds of sustainable financial instruments.

Overall, this work demonstrates that the factors influencing the move towards greenium concept in emerging markets involve economic, political and regulation forces. Although Asia dominates the greenium premiums presently, there are pitfalls in Latin America and Africa that prevent them from attaining the higher premiums. However, these regions are also many opportunities to in the future. Policy makers, issuers and investors need to collectively work towards developing unambiguous rules and efforts that promote green securities to help unlock a new world of greenium in emerging markets, which is crucial to support the global shift towards a sustainable and climate change resilience economy.

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