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Sustainable Bonds As A Mechanism For Investment Financing

Abstract

This paper highlights the growing role of green bonds—also known as sustainable bonds or green sukuk—as innovative tools for financing environmentally friendly investments. First introduced by the World Bank in 2007, green bonds aim to fund projects tackling climate change and promoting sustainability, including areas like renewable energy, energy efficiency, and biodiversity conservation. These instruments offer an attractive option for investors committed to ethical and ecological goals. Although they present clear benefits—such as transparency and strong institutional backing—they are not entirely risk-free. Notably, they may be influenced by fluctuations in currency markets and other economic variables. Nonetheless, green bonds are seen as a significant step toward mobilizing private capital for global sustainability efforts, even if they cannot fully resolve all environmental financing challenges.

Keywords: Green bonds, sustainable finance, climate change, renewable energy, environmental investment

Sürdürülebilir Tahvillerin Yatırım Finansmanı Mekanizması Olarak Rolü

Öz

Bu çalışma, çevre dostu yatırımların finansmanında yenilikçi araçlar olarak giderek daha fazla önem kazanan yeşil tahvillerin—diğer adıyla sürdürülebilir tahviller veya yeşil sukukların—rolünü incelemektedir. İlk kez 2007 yılında Dünya Bankası tarafından ihraç edilen yeşil tahviller, iklim değişikliğiyle mücadele ve sürdürülebilirliğin teşviki gibi amaçlarla projelerin finansmanını hedeflemektedir. Bu kapsamında yenilenebilir enerji, enerji verimliliği ve biyolojik çeşitliliğin korunması gibi alanlar öne çıkmaktadır. Etik ve ekolojik hedeflere bağlı yatırımcılar için cazip bir seçenek sunan bu finansal araçlar; şeffaflık ve güçlü kurumsal destek gibi belirgin avantajlar sağlasa da, tamamen risksiz değildir. Özellikle döviz piyasalarındaki dalgalarname ve diğer ekonomik değişkenlerden etkilenme olasılığı bulunmaktadır. Yine de yeşil tahviller, çevresel sürdürülebilirlik çabaları için özel sermayeyi harekete geçirmede önemli bir adım olarak görülmektedir; ancak tüm çevresel finansman sorunlarını tek başına çözmeleri beklenmemelidir.

Anahtar Kelimeler: Yeşil Tahviller, Sürdürülebilir Finans, İklim Değişikliği, Yenilenebilir Enerji, Çevresel Yatırım

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Introduction

The global financial landscape has witnessed a significant innovation with the emergence of sustainable bonds, also known as green sukuk, as a dedicated mechanism for investment financing. Pioneered by the World Bank in 2007, during a period of limited environmentally focused investment opportunities, these are debt instruments specifically designed to raise capital for projects addressing climate and environmental challenges. This study introduces sustainable bonds as a pivotal tool that bridges the gap between investor demand for safe, diversified portfolios and the urgent global need to fund green initiatives. These projects span renewable energy, biodiversity conservation, climate change adaptation, and sustainable infrastructure—positioning green bonds as a critical component of modern sustainable finance.

This research is significant for several reasons. Firstly, it addresses the critical financing gap for environmental projects by highlighting a viable and growing mechanism. Secondly, it provides valuable insights for investors, particularly those in the sustainable and responsible investment sector, by elucidating the characteristics, advantages, and risks of this asset class. Furthermore, the study is significant for policymakers and issuing entities (such as governments and corporations), as it outlines the potential of green bonds to mobilize large-scale capital for climate-related goals, while also cautioning about associated risks. By examining a tool pioneered by a major institution like the World Bank, the study contributes to understanding how financial innovation can support global environmental sustainability.

General Objective

To elucidate the role and importance of sustainable bonds (green bonds/sukuk) as a modern mechanism for financing investment in environmental and climate-related projects.

Specific Objectives

This study establishes several specific objectives to comprehensively investigate sustainable bonds as an investment financing mechanism. Primarily, it seeks to describe the fundamental structure and purpose of these instruments, delineating their unique characteristics as debt vehicles. Furthermore, it aims to identify and categorize the specific types of green projects financed by these bonds, such as renewable energy initiatives and sustainable waste management systems. Subsequently, the research will analyze the dual-faced value proposition of green bonds by examining their advantages for both investors—as a secure and diversifying asset—and for issuers, as a strategic financing tool. Finally, to provide a balanced assessment, the study will critically examine the potential risks inherent in these instruments, including their susceptibility to external volatilities such as currency market fluctuations. The study operates on the central hypothesis that while sustainable bonds represent a progressive and effective step

toward reducing environmental risks and financing the transition to a greener economy, they are not a panacea and are accompanied by inherent financial risks that limit their overall efficacy as a standalone solution.

This study will employ a qualitative descriptive approach based on secondary data. The methodology will involve an extensive literature review and documentary analysis of existing reports, academic publications, and market analyses from reputable sources such as the World Bank and other financial institutions. This will allow for a comprehensive exploration of the genesis, mechanisms, benefits, and risks of sustainable bonds as presented in the existing body of knowledge. In light of increasing environmental challenges and the impacts of climate change, and the rising need to finance the transition towards a green economy, sustainable bonds have emerged as one of the innovative financial mechanisms aimed at bridging the funding gap for environmentally friendly investments.

However, the core problematic issue raised by this mechanism revolves around its effectiveness and real feasibility as a tool for financing green investment. The question is not limited to its ability to mobilize capital alone but extends to evaluating the dimensions of this effectiveness in terms of efficiency, risks, and tangible impacts. From this standpoint, the main problem can be formulated as follows: "To what extent can sustainable bonds be an effective and reliable mechanism for financing green investment in the face of environmental and climate challenges?"

Conceptual Framework

A bond is a financial instrument representing a lending agreement in which investors provide funds to an issuer under pre-agreed terms. Unlike stocks, which offer ownership rights, bonds classify as fixed-income securities due to their predetermined interest payments and repayment of principal on a specified maturity date. This predictable cash flow makes them appealing to risk-averse investors (The World Bank, 2015). After their initial issuance—typically through authorized financial intermediaries—bonds can be traded in financial markets. In contrast, stocks grant shareholders partial ownership in a company, and their returns vary based on company performance, dividend distribution, and market valuation. Nevertheless, both asset types are traded in securities markets (The World Bank, 2015). In the case of green bonds, which are central to this discussion, they are structured specifically to fund environmental or climate-related initiatives. What differentiates them from traditional bonds is the clear linkage between the capital raised and its use in sustainability projects. Investors in green bonds assess not only financial elements such as coupon rates, maturity, and issuer

creditworthiness but also the specific environmental goals tied to the funded projects (The World Bank, 2015).

The Concept of Green Bonds

In recent times, terminology highlighting environmental concerns—such as green economy, green investments, eco-cities, sustainable buildings, and green bonds—has become increasingly widespread. These concepts all revolve around environmentally conscious development strategies. The growing global emphasis on ecological priorities is largely driven by the harmful impacts of pollution stemming from industrial activities and transportation, which continuously release emissions. These emissions contribute to rising carbon dioxide concentrations and ozone layer depletion, thereby threatening ecological balance.

Green bonds play a crucial role within sustainable finance by supporting the transition to a low-carbon economy. They provide investors an avenue to engage in projects that address environmental challenges and foster sustainability. As businesses increasingly align their investment frameworks with sustainable goals, the influence of green bonds continues to grow. These instruments not only reshape the financial system but also reinforce global efforts to mitigate climate change and advance sustainable development objectives. By addressing risks and seizing the potential of green bonds, both corporations and investors can significantly influence the broader sustainability movement (Yadav, Singh, Singh, & Singh, 2024, p. 593). Green bonds are debt securities whose proceeds are exclusively applied to projects with environmental or climate benefits. Unlike conventional bonds, they offer investors an opportunity to align financial returns with environmental, social, and governance (ESG) objectives. Since the first green bond was issued in 2007, the market has grown exponentially, attracting both sovereign and corporate issuers. Importantly, green bonds provide a mechanism for emerging economies to tap into international capital markets, attract socially responsible investors, and diversify their funding sources beyond traditional loans and aid (Ndukaji, 2025).

Definition of Green Bonds

Definition No. 1

Bonds are essentially an agreement whereby bond issuers borrow money from investors and repay them with an agreed-upon interest after specified periods.

Definition No. 2

Green bonds are a type of bond for which the proceeds from issuance are exclusively used to finance or refinance, in whole or in part, new or existing green projects, in accordance with the four core principles of green bonds.

Definition No. 3

Green bonds refer to bonds linked to environmentally friendly investments. They are debt instruments issued to raise funds specifically allocated to finance projects related to climate or the environment. The specific use of the obtained funds to support the financing of certain projects is what distinguishes green bonds from traditional bonds (Alduwli, 2019).

Authorities Competent in Issuing Green Bonds

Banks as well as public and private institutions can issue green bonds, as follows:

Banks

National and international banks can issue green bonds. Among the most prominent banks that have done so are: the World Bank, the European Investment Bank, the African Development Bank, etc. (Shawqi, 2021).

Institutions

These are represented by private companies and financial institutions such as commercial banks, investment banks, and development banks.

Governments and Municipalities

Government bodies can issue green bonds as a means to finance specific local projects or achieve environmental goals. Municipalities can also issue green bonds with the aim of involving local stakeholders in financing sustainable solutions (Bourouba, Safi, & Younes, 2020).

The Emergence of the Idea of Green Bonds

In late 2007, the Treasury Department at the World Bank received a sudden phone call from a group of Swedish pension funds, who wanted to invest in projects that consider climate change but could not find a way to reach their goal. In cooperation with the World Bank, what is now known as green bonds was invented. The institution issued its first green bonds, creating a new method to link financing from investors to climate-related projects.

Since the Paris Climate Agreement in 2015, banks around the world have pumped more than \$3.6 trillion into fossil fuel projects, which is nearly three times the total amount of bonds and loans supporting green projects, according to Bloomberg agency data (Shawqi, 2021).

Objectives of the Green Bond Principles

The main objective of the Green Bond Principles (GBP) is to encourage their broad implementation within financial markets. These principles guide issuers in the fundamental components needed to structure reliable green bonds. At the same time, they help investors by improving access to essential data, allowing them to assess the environmental effects of their

green bond portfolios. Furthermore, the principles promote greater transparency, assisting underwriters in facilitating transactions by fostering information disclosure in the market.

Disclosure and Transparency Standards

The GBP recommend that issuers offer detailed and clear information during the issuance stage. This information is critical for various stakeholders—including banks, investors, underwriters, and subscription agents—to comprehend the specific features of a given green bond. Emphasis is placed on the importance of transparency, accuracy, and integrity in all disclosed data shared with stakeholders throughout the issuance process (Association, 2018).

Core Principles of Green Bonds

The Green Bond Principles are structured as voluntary but effective guidelines aimed at promoting trust in the green bond market. They prioritize full transparency and disclosure, aiming to increase the integrity of the issuance process. Through the standardization of practices and clear communication of issuance methods, the GBP seek to contribute to the growth and credibility of the green bond sector. The framework is built on four fundamental principles that shape the issuance and evaluation of green bonds (Association, 2018).

Principle One: Use of Proceeds

One of the core conditions for issuing green bonds is that the capital obtained must be strictly directed toward financing or refinancing projects that are environmentally sustainable. These projects must be transparently outlined in the official bond documentation and are expected to deliver verifiable environmental benefits. In line with the Green Bond Principles, qualifying projects are those that align with key environmental goals, including:

- *Combating climate change
- *Enhancing resilience to climate impacts
- *Managing and preserving natural resources
- *Protecting ecosystems and biodiversity
- *Reducing pollution and preventing environmental degradation

This principle also promotes financial transparency by ensuring that fund allocation is clearly communicated. It reinforces the reliability of the green bond itself and strengthens the trust of investors in the environmental value of the projects being financed (International Capital Market Association [ICMA], 2018, p. 3).

Principle Two: Process for Project Evaluation and Selection

The second core principle of the Green Bond Principles underscores the obligation of issuers to establish a clear and credible evaluation and selection process for green projects. As emphasized by the International Capital Market Association (ICMA, 2018, p. 4), issuers are

expected to outline their overall environmental objectives, the methodology employed to identify and select green projects, and the screening criteria used to address potential environmental and social risks.

Furthermore, issuers should align their disclosures with broader environmental strategies and goals. Making references to internationally recognized standards or certifications during project selection adds further transparency. To strengthen trust and credibility, it is recommended that issuers engage independent reviewers to assess their selection and evaluation methods. These practices are essential to boosting investor confidence and ensuring the credibility of green bond initiatives.

Principle Three: Management of Proceeds

In line with the Green Bond Principles, issuers are required to manage the net proceeds from green bond issuance in a structured and traceable way. Funds should be placed in dedicated accounts or portfolios, or otherwise monitored through reliable internal systems that reflect lending and investment activities related to green projects.

As long as the bond remains active, the allocation records must be regularly updated to match project financing needs. Any funds that have not yet been allocated must be transparently disclosed, along with an explanation of their intended use. Moreover, it is advised that issuers engage an external auditor or third party to verify both the tracking methodology and the allocation of proceeds. This practice reinforces transparency and upholds investor trust in the bond's environmental integrity (ICMA, 2018).

Principle Four: Reporting

The fourth principle of the Green Bond Principles, as outlined by the International Capital Market Association (ICMA, 2018, p. 05), emphasizes the importance of transparency and disclosure regarding the use of proceeds from green bonds. Issuers are required to make relevant information publicly available and update it annually until the full allocation of proceeds is completed. Furthermore, they must ensure that any material changes to the financed projects are communicated in a timely manner. This reporting should include a summary of the projects, the amounts allocated to each, and the anticipated environmental impact. In cases where project-level disclosure is impractical—due to business confidentiality, competitive sensitivity, or a high volume of financed projects—reporting at the portfolio level is encouraged. For instance, issuers may present the percentage of total proceeds allocated to various project categories. Nonetheless, transparency is especially critical when it comes to conveying the environmental benefits of the funded projects. The GBP also recommend the use of both

qualitative performance indicators and quantitative performance metrics whenever feasible. These may include metrics such as improvements in energy efficiency, renewable electricity generation, reductions or avoidance of greenhouse gas emissions, increased access to clean energy, reduced water usage, and decreased vehicle use. Issuers are further encouraged to disclose the methodologies and assumptions used in deriving these estimates, and, when possible, to report on the actual achieved environmental impacts.

To facilitate consistency and comparability across issuers, voluntary reporting guidelines are made available. These templates, developed for sectors such as energy efficiency, renewable energy, water and sanitation, and waste management, can be tailored by issuers to fit specific project contexts. The Green Bond Principles also promote the ongoing development of sector-specific templates to enhance reporting practices across emerging areas of green investment.

Additionally, the GBP offers issuers the option to fill out a form outlining the characteristics of the green bonds or green bond program and clarifying its main features according to the four core principles. This form is made publicly available online to facilitate information dissemination in the market and support transparency (Bouaouina & Elmi, 2022). Green bonds represent a multifaceted financial instrument, characterized by their ability to attract sectors and investors interested in environmental, social, and governance (ESG) criteria—thereby promoting sustainable and responsible development trends. They also offer a unique financial advantage by serving as a low-cost financing tool compared to traditional instruments, often benefiting from tax exemptions or yield discounts. This reduces the tax burden on issuing entities and enhances their economic feasibility (Almansour, 2021). Green bonds are considered a safe investment vehicle, providing fixed and regular income. They contribute to reducing borrowing costs, as higher demand for these bonds results in lower interest rates for issuers. Furthermore, green bonds are regarded as a strategic mechanism for building an economy that actively addresses environmental risks. By investing in projects that target climate and environmental issues, investors contribute positively to the creation of a more resilient economy, thereby enhancing budgets and mitigating both economic and environmental risks (Almansour, 2021).

Examples of Environmentally Sustainable Projects Eligible for Green Bond Financing

According to the Green Bond Principles issued by the International Capital Market Association (Association, 2018), a wide range of environmentally sustainable projects may be considered eligible for financing through green bond issuance. The following is a non-exhaustive list of such projects:

*Projects focused on renewable energy generation and distribution, including the deployment of technology and equipment designed for sustainable power sources.

*Energy-saving projects, involving improvements in both new and existing structures, as well as energy storage solutions, district heating, smart energy networks, and energy-efficient technologies.

*Pollution control and prevention initiatives, targeting reductions in harmful emissions, soil restoration, recycling promotion, and energy recovery from waste using eco-efficient methods.

Activities supporting the sustainable use of land and natural resources, such as environmentally responsible farming, livestock management, resilient agricultural inputs (e.g., drip irrigation, biological pest control), eco-friendly fish farming, and afforestation or conservation programs.

*Efforts aimed at preserving biodiversity, focusing on the protection of marine and terrestrial ecosystems, especially coastal and aquatic environments.

*Development of low-emission transport infrastructure, including electric and hybrid vehicles, cycling paths, pedestrian-friendly systems, and projects reducing the carbon footprint of transportation.

*Water and sanitation infrastructure projects, such as systems for clean water delivery, wastewater treatment, sustainable urban drainage, river management, and flood control solutions.

*Measures for adapting to climate change, including early warning technologies, environmental data monitoring, and strategies for improving climate resilience.

*Projects contributing to the circular economy, such as the manufacturing of sustainable products with environmental certifications and innovative distribution or packaging methods aimed at minimizing environmental impact.

*Construction of green-certified buildings, adhering to established ecological standards at local, national, or global levels.

Challenges Facing Green Bonds

Among the challenges facing the green bond market, the most critical is the issue of market liquidity, as it remains relatively small. The scarcity of green bonds available in some markets is considered one of the main obstacles, despite a strong presence of interested investors. This reflects the absence of financeable green projects in certain regions—projects that could otherwise be financed or refinanced through green bond issuance.

In addition, there is a lack of awareness regarding the benefits of green bonds, related guidelines, and international standards, often due to the absence of localized frameworks. Furthermore, costs and procedural requirements also represent significant challenges. The evaluation of green bonds and the verification of their environmental effectiveness and contribution to sustainable development require the involvement of specialized third parties. This process is costly and therefore constitutes a considerable barrier, especially for small companies considering issuing such bonds (Azaizia, 2020).

Conclusion

To conclude, green bonds represent an innovative mechanism for financing environmentally sustainable investments. They serve as a critical means of expanding the scope of environmentally friendly initiatives and supporting global sustainable development goals—provided that they are properly adopted and regulated. Despite their many advantages, green bonds are still in the early stages of adoption, characterized by a relatively small financial market and a degree of ambiguity, even with the principles and assurances provided by the World Bank. Therefore, this market is not without risks, despite its clear benefits and its noble environmental objectives—such as environmental preservation, pollution reduction, lowering carbon dioxide emissions, and supporting renewable energy projects. Many banks—including the World Bank—and countries across the globe, including several Arab and Islamic nations, have begun issuing green bonds and developing local markets to finance their environmental initiatives. Examples include the UAE, Egypt, Malaysia, China, and others, with varying degrees of success. The primary suggestion offered in this study concerns Algeria, which could benefit significantly from adopting green bonds as a tool for financing domestic green investments. This would be especially beneficial as the country pursues development programs aligned with the United Nations Sustainable Development Agenda 2030. Algeria's environmental and energy diversity could play a vital role in supporting a green economy, ultimately contributing to both economic and social development within the country.

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