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# Certain Issues of Green Bonds and Their Perception by Financial Markets, with Focus on Hungary

## SUMMARY

The environmental load of the economies and climate change have increasingly necessitated green investments, financed by the so-called green bonds, invented by financial markets. The author analyses the green goals to be achieved by issuing green bonds as market instruments, and the structuring of funding in terms of risks and cash-flows, through specific cases in progress. The Hungarian sovereign green bond issue is an example of a successful fundraising from the capital markets, and the central bank initiative is a case for helping the private sector in the green transition. It is found that the success of green financing depends primarily on the financial market participants' perception of the safety of investment in green bonds. An essential element is certification by an external third party, to assure investors that the project being financed will not only result in financial returns but also in environmental benefits.

## Journal of Economic Literature (JEL) codes:

G10, H63, O16, Q50

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## INTRODUCTION

Terms such as “global warming”, “melting of large-scale glaciers”, frequent “forest fires”, “extreme weather”, or “COVID-19” teach us a more general lesson: ecology and pandemics know no borders: human beings are of the same community of destiny. With environmental pollution, resource waste, ecological environment deterioration and other conditions gradually affecting people's lives, the idea of advocating low consumption and high efficiency of green economy has become the direction of the development of the world economy (Wiśniewski and Zieliński, 2019; Tripathy, 2017). There is no doubt that the emergence of green finance to solve the problems of the difficult and expensive financing of green projects

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is of utmost importance (Zhou and Cui, 2019). Green bonds, as the most common financial instrument in the green financial market, have received extensive attention (Dou and Qi, 2019, which gave significance to the current study.

This paper describes the market development of green bonds by differentiating these instruments from the other types of sustainable instruments, and investigates into the practical issue and trade of these financing instruments, by introducing some best cases.

#### LITERATURE REVIEW

According to the literature, environmental finance is not simply defined as the adoption of financial decisions without neglecting the impact of the decisions on the social and surrounding environment, but rather as the use of financial resources for investment into projects that provide environmental benefits (Bieliński and Mosionek-Schweda, 2018; Hafner et al., 2020) and lead to transition to a low-carbon global economy (Sartzetakis, 2020). The referenced environmental benefits include, inter alia, reducing air, water and soil pollution, and greenhouse gas emissions, and improving natural energy efficiency, mitigating or adapting to climate change, and so on. Green financing therefore uses financial markets and resources to solve existing environmental problems (Agliardi and Agliardi, 2019).

Green finance links the global environment to the economic system. A growing population, rapidly rising living standards and frequent extreme climate-related events are putting enormous pressure on the environment. In order to alleviate these pressures, industry should be encouraged to produce and use resources within safe limits. As an instrument of green finance,

green bonds are issued to alleviate the risks associated with environmentally-neutral investment decision making criteria (Gianfrate and Peri, 2019). As a result, green finance can not only promote environmental protection and governance, but more importantly, guide resources from high-pollution and energy-intensive industries to sectors with advanced ideas and technologies (Lebelle et al., 2020).

Green bonds are acknowledged by investors as advantageous financial opportunities that carry higher added value compared to risk (Chatzitheodorou et al., 2019; Deschryver and De Mariz, 2020; Tang and Zhang, 2018), as a means for resource-efficient investments (Cochu et al., 2016). Flammer (2020) documents the signalling effect of green bonds: by this act the issuers credibly signal their commitment towards protecting, maintaining or restoring the environment. This, in turn, strengthens the issuers' commitments towards tracking their declared sustainable development goals. Due to these positive perceptions, green and sustainable bonds (especially the certified bonds, Hyun et al., 2019; Li et al., 2019) are priced at premium on financial markets (Fatica et al., 2019; Hachenberg and Schiereck, 2018; Zerbib, 2019).

As green and sustainable bonds constitute a prospective dimension in global debt markets (Laskowska, 2017), as a means of raising financial resources to develop economies that are low-carbon ones and resistant to climate changes, it is reasonable to systematise the stimuli of the evolution of this process. On debt markets one may find several examples for layering risks and cash flows (Czelleng, 2019), i.e. via structured trade finance (Kozár and Suták, 2012), the pre-financing of development banks (Neszmélyi, 2019) or credit guarantees

(Sági, 2017; 2018). Therefore, it is recommended to apply these tools – together with community-based trust funds (Vallyon, 2011), green credit guarantee schemes, spill-over tax, etc. – to green finance (Taghizadeh-Hesary and Yoshino, 2020). Besides, green and sustainable bond issues might strengthen the resilience of the financial intermediaries that have a proactive role in green project finances, especially in less developed countries (Saleem and Ashfaq, 2020; Ampah and Kiss, 2019).

There is consensus in the literature that macroeconomic and institutional factors increase green bond issuance volumes (Tolliver et al., 2020). Governmental incentives, *per se*, are applicable to create a legal and institutional frame in which corporations may grow and prosper (Lentner, 2019), improve financially (Sági et al., 2020), and become socially more responsible (Migliorelli and Dessertine, 2019). Green bonds play an essential role in shifting capital to more sustainable economic activity (Maltais and Nykvist, 2020). This may, in turn, initiate corporations to invest into green projects, and thus to enhance green creativity (Zhang et al., 2020). In relation to this, Györi and Ócsai (2014) identified the preconditions of remaining profitable for businesses with an ecological focus. One of the preconditions is that these businesses are committed to follow their environmental and ethical goals. This persistence of greenness, if credible, may contribute to long-term sustainability of economies.

#### EVOLUTION OF GREEN BONDS AND THEIR CLASSIFICATION

After initial emergence of the concept of green bonds in 2007, the European Investment Bank (EIB) issued the world's first en-

vironment-friendly bond, named climate-awareness bond, to finance its renewable energy and energy efficiency projects. The term “climate awareness” makes it clear that the money had been raised was used for financing the implementation of green projects, under given terms and conditions (Lo Giudice, 2017). In 2008, the World Bank issued the world's first green bonds, with the purpose to raise money for projects to mitigate climate change. Since then, the issuance volume and scale of green bonds has been constantly increasing, alongside with the necessary improvement of the market infrastructure (Migliorelli and Dessertine, 2019).

Since then, green bonds have started to develop rapidly on an international scale (Climate Bonds Initiative, 2020). By the end of 2019, the global total issuance of green bonds had been about USD257.7bn, which set a new record for the annual issuance scale, with a year-on-year increase of 51 per cent (the data at the end of 2018 was about USD170.6bn). However, despite of the intense scaling of green bonds, there is no uniform definition for the term. The World Bank, which first came up with the concept of green bonds, classifies them as regular fixed-income bonds, but what makes them special is that they create a way for investors to protect the global environment and improve the climate. The Organisation for Economic Co-operation and Development (OECD) defines green bonds as “debt instruments used to finance green projects that deliver environmental benefits. A green bond is differentiated from a regular bond by its commitment to use the funds raised to finance or refinance “green” projects, assets or business activities” (GFSG, 2016). The purpose of the issue can be either raising capital for projects

or for re-financing purposes, or freeing up capital and leading to increased lending.

The most specific and rigorous definition of green bonds in the bond market is one that the International Capital Markets Association (ICMA), in conjunction with several institutions around the world, has come up with. According to this definition, a green bond is a debt-type financial instrument, whereas the funds raised by the product should only be applicable to undeveloped or existing green projects, which deal with climate issues or other projects with the goal of sustainable development (International Capital Markets Association, 2018).

In a more general context, green bonds, similarly to social and sustainability bonds, carry proceeds from environmental and social projects (TEG, 2019). In the case of green bonds these proceeds are exclusively applied to finance or re-finance projects with clear environmental benefits in agreement with the four core components of the Green Bond Principles. Environmental benefits should relate to renewable energy, energy efficiency, pollution prevention and control, eco-efficient products and/or products adapted to a circular economy, production technologies and processes, green buildings, terrestrial and aquatic biodiversity conservation, clean transportation, etc.

In comparison, social bonds finance projects that directly aim to address or mitigate a specific social issue and/or seek to achieve positive social outcomes for a target population. Social project categories include, among others, providing and/or promoting: affordable basic infrastructure, access to essential services, affordable housing, employment generation, food security, or socioeconomic advancement and empowerment. Sustainability bonds relate to

financing or re-financing a combination of green and social projects and which are aligned with the four core components of the Green Bond Principles and Social Bond Principles.

In conclusion, any of the aforementioned bonds have been designed to finance (or re-finance) environmental and/or social purposes. Green, social and sustainability bonds are regulated instruments subject to the same capital market and financial regulation as other listed fixed income securities (International Capital Market Association, 2020a).

#### CASE STUDIES FOR GREEN BOND ISSUANCE: 1 THE UNITED STATES' MUNICIPAL GREEN BOND ISSUE

Back in 2014, a historic USD 350mn issuance represented Washington DC Water's inaugural green bond issue and the first "certified" green bond in the US debt capital markets with an independent second party sustainability opinion (International Capital Market Association, 2020b). The bond has a maturity of 100 years and a yield of 4.814 per cent to maturity. According to Moody's, the credit rating of the project is Aa.

The environmental link of bond financing is obvious: due to climate change, a series of rainy days made the local precipitation increase rapidly within the territory of Washington DC. As a result, not only the local water quality has been affected, but the workload of sewage treatment plants also increased. This sewage system project – laying water-absorbing bricks on the ground and build an ecological regulation pool which facilitates environment-friendly water-treatment – was designed to have a positive effect on the ecological environment and meets the standards of a green bond.

The structuring of financing is as follows: Vigeo Eiris, the French corporate social responsibility agency, has green-certified the bonds. In this process, the agency checked the project evaluation, fund management and reporting disclosure of the project in accordance with the four principles of Green Bond Principles, and, as a result, it confirmed that the project met the standards of green bond, and issued relevant report to investors based on the certification status. In addition to this report, DC Water has invited international institutional investors (mainly investment banks and pension funds) to promote the green municipal bond offering. The approval of these institutions and the “second opinion” given by the third-party certification agencies have ensured the standard issuance of green municipal bonds and attracted certain investors, laying the foundation for the successful issuance of the bond. The project has also attracted the attention of many socially responsible investors because it helps improve the city’s public environment and facilities. That enabled DC Water to raise more money for the project at lower bond rates.

Similarly to any structured financing, a strict monitoring of the use of the funds follows. The follow-up supervision of this green municipal bond fund is to be performed by the third-party certification agency (Vigeo Eiris). The issuer shall disclose the information according to the use of funds, the progress of the project and the impact of the expected effect every year, and report the information to the investors. At the same time, for this sewage treatment facility construction project, the government agency has also set up a corresponding supervision group to carry out irregular supervision on the fund operation status of the project and report the situation to the

investors. Strict regulatory system and disclosure requirements ensure that the green municipal bond project is dedicated to the fund, preventing the occurrence of irregularities in the use of funds.

This green municipal bond has a specialty of a performance-based payment mechanism. According to this term, the third party shall calculate and evaluate the effect of the green project. If the effect is positive and meets the certain standard, the bond investors can get an extra USD 3.3mn in return. If the effect is not sufficiently positive, the investors shall pay USD 3.3mn to DC Water. If the effect falls between the two criteria, the investors gain an agreed return. This special “performance-based payment” incentive mechanism increases the attractiveness of the bond among investors to subscribe, besides the fact that the bond is highly ranked (Aa) and is safe for institutional investors.

#### CASE STUDIES FOR GREEN BOND ISSUANCE: 2 HUNGARY’S SOVEREIGN GREEN BOND ISSUE

The rationale for the initial Green Bond Scheme of Hungary has been to support its commitment to combatting climate change and biodiversity loss, and to raise funding from the capital markets. By the issuance of green bonds, Hungary declared its intention to proactively contribute to the development of Sustainable Finance both in international and in Hungarian capital markets. In addition, the Green Bond Scheme responds to international investors’ demand for green bonds issue, and contributes to the further diversification of Hungary’s investor base (ÁKK, 2020).

Based on the Green Bond Scheme, Hungary issued its first international green

bond in June 2020, in a total amount of EUR 1.5 billion. The bond series has a 15-years term, and a fixed coupon rate of 1.75 per cent per annum. The chief underwriters were the Credit Agricole CIB, the ING Bank and the J.P. Morgan. The issue was in line with the conventional sovereign Bonds of the Hungarian State and referred directly to the Green Bond Scheme (which is in line with the voluntary guidelines of the Green Bond Principles published by the International Capital Markets Association) for the use of proceeds and reporting commitment.

The net proceeds of the green bond issuance are intended to finance or refinance expenditures within Hungary's central government budget contributing the transition to a low carbon, climate-resilient and environmentally sustainable economy. Hungary includes eligible green expenditures within the category's renewable energy, energy efficiency, living use and living natural resources, waste and water management, clean transportation and adaptation.

Based on the third-party agency review, the rate the Hungary's green bond framework CICERO Medium Green. CICERO Green considers four factors in its review of the issuer's governance processes: 1) the policies and goals of relevance to the Green Bond Scheme; 2) the selection process used to identify and approve eligible projects under this framework, 3) the management of proceeds and 4) the reporting on the projects to investors (Cicero Shades of Green, 2020). Among the six environmental categories, renewable energy projects were marked by dark green in the case of Hungary, land use and living natural resources by medium green, energy efficiency alike to waste and water management as light to medium green, clean transportation as

light to dark green, and adaptation to climate change as medium to dark green.<sup>1</sup>

As a key component of the issue, investors were invited from a broader scope, and their interest was outstanding: more than fivefold, and the bonds were successfully sold above the original price quote (EUR midswap + 240 bp) by 50 basis points.

Regarding the future use of these funds, the National Bank of Hungary in its regulatory role in respect of the commercial banks, has laid down the fundamentals of green finance (MNB, 2019a). In this respect, the National Bank of Hungary complies with the green taxonomy of the European Commission (TEG, 2020a), including the energy efficiency criteria for housing.

The European Union's green taxonomy is a tool designed to identify projects aimed at green transition, changing polluting activities, and access to finance adoption of low-carbon activities. Funding for these green projects is mainly generated through the issuance of green recovery bonds (TEG, 2020b).

An important issue was raised in relation to the Capital Requirements Regulation (CRR) of commercial banks, on whether the supervisory authority may differentiate capital requirements, depending on sustainability considerations, i.e. to encourage financial intermediaries to increase lending in green finance. The European Banking Authority is expected to prepare a directive by 2025 on the eligibility of easing capital requirements in the case of green lending portfolios (MNB, 2019b).

Consideration of a Green Supporting Factor (GSF) or a Brown Penalty (BP) for capital reserve requirements is also consistent with EU climate and sustainability objectives (2° Investing Initiative, 2020). According to estimates, the effect of a re-

duction in capital requirements associated with a GSF would likely be significantly lower than a brown penalty through strengthening capital reserves. The main reason behind the stronger effect of the latter is the widespread use of high/carbon assets compared to sustainable green assets. Nevertheless, transition to a greener economy would imply a supporting factor in capital reserve requirements, too.

The rationale behind lower capital requirements in retail banking is that in comparison to other housing loans, lower credit risk is attributed to green housing loans. This argument can be explained by the lower probability of default and the lower loss given default of the later (MNB, 2019a). On one hand, the homeowners of energy efficient properties can dispose of a higher income available for repayment after paying overhead costs, which reduces PD. On the other hand, green properties – due to increasing demand and stricter regulations – can be expected to retain their value even in the longer terms, so as their collateral value in the case of default of the mortgage loan (lower LGD).

Accordingly, preferential rates of capital requirements will be applied for the Hungarian-resident commercial banks' credit exposures of green (sustainable) mortgage and consumer loans. The reduction is 5 per cent in the case of renovation and in the case of building or purchasing a property with 'BB' rating, and 7 per cent in the case of building or purchasing a property with at least 'AA' rating. However, the preference is maximised to the 1 per cent of the total risk exposure amount (TREA) of any individual commercial bank (so that a maximum reduction of 1 percentage point of the SREP capital requirement can be earned). Also, the supervisory capital requirement is de-

termined using end-of-year data during the Internal Capital Adequacy Assessment Process (ICAAP) review conducted in the following year (MNB, 2019b).

The precondition for the preferential rate of capital requirement to be received is that the commercial bank offers lending at an interest rate lowered by minimum 0.3 percentage points. This lowering, compared to the average interest rates of 4-5 per cent and 12-13 per cent typically granted in the previous months on housing loans and personal loans, is not deteriorating the commercial banks' profitability, but is still providing substantial benefit to the borrowers (MNB, 2019b).

Lastly, only credit institutions that undertake to comply with the complementary green reporting requirement are eligible for green capital requirement reduction. This requirement, among others, will strengthen the supervisory role of the National Bank of Hungary.

#### DISCUSSION: FACTORS INFLUENCING AN EFFECTIVE BOND ISSUE

The best cases, like the ones described in above, reveal the necessary elements of a successful issue of green (or sustainable) bonds. The green or sustainability purpose is the grounding for raising funds via these financial instruments. If the implemented capital expenditures of the project correspond to climate risks and impacts, the implementation provides rationale for the issuance of the green bond (Baulkaran, 2019).

In the above cases, the institutional market framework has been provided as well, in order to support the underwriting, allocation and advisory of the bond issue. Anh Tu et al. (2020) points at the fact that legal infrastructure, official interest rate of green

bonds, and the economic stability of the issuer's country are the most important factors directly affecting green bond market expansion. Bachelet et al. (2019) also reveals that green third-party verifications are essential to increase investors' confidence and thus to promote the successful issue.

According to their pricing, green bonds are affected by price spill-overs from fixed-income markets (Reboredo, 2018; Reboredo and Ugolini, 2019). Partridge and Medda (2020) found that there is no clear indication in the literature as to whether or not there is a "greenium," or green premium in the case of the issue of environment-related bonds (on the primary markets), although there is a stronger signal for greenium in the secondary markets. Also, green issuers are supposed not to be incentivised to price their bonds higher for fear of pricing themselves out of the market; as this happened in the case of DC Water. However, at the Hungarian green bond issue, a 50 basis points premium was noticed.

#### SUMMARY AND CONCLUSIONS

Green finance includes economic activities that support environmental improvement, cope with climate change and, more importantly, guide resources from high-pollution, high-energy industries to technologically advanced ones. Through selection of project categories with clear environmental benefits, green bonds aim to provide investors with certainty that their investments deliver environmental returns and financial returns.

Practical implications were drawn from the case studies, so that the issuance of green municipal bonds could provide funding for the modernisation of the water and sewage system. The Hungarian example shows that the issuance of green sov-

ereign bonds is best suited within a green bond scheme, which aims at contributing the country's transition to a low carbon, climate-resilient and environmentally sustainable economy. There is a fair indication that the green sovereign bond issue will play a good benchmarking effect, helping to guide more funds to the green field.

The initiative of the National Bank of Hungary for green preferential capital requirement predicts increase in the supply of green finance. Commercial banks which decide to participate in lending for green housing, will benefit from the decrease in their capital requirements, and, in accordingly, will lessen the interest rates applied to borrowers, and thus to encourage energy-efficiency related housing projects. Assuming that the green housing loans bear lower credit risk because the PD is lower, and that the mortgages maintain their collateral value in the long term because of the green value (therefore lower LGD is expected), commercial banks are exposed to lower risks on their green loans.

The author expects that due to the global pandemic COVID-19, public attention to ecological and green projects will intensify. Efforts at promoting green awareness will make investors realise that the current ecological environment is in a state of crisis. Thus, when making investment, they will tend to consider not solely the yield of bonds, but also the positive environmental effects generated by the projects supported by these bonds.

#### NOTE

<sup>1</sup> The shading methodology of CICERO aims to provide transparency to investors that seek to understand and act upon potential exposure to climate risks and impacts. In this regard, the scaling tops with dark green (allocated to

projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future), and bottoms at brown (allocated to projects and solutions that are in opposite to the long-term vision). Within the scale. Medium green represents steps towards the long-term vision, but are not quite there yet.

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