

The role of the green bonds in public-private partnerships as a sustainable investment opportunity

Uloga zelenih obveznica u javno-privatnim partnerstvima kao mogućnost održivog ulaganja

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Abstract: In light of the COVID-19 crisis that has started in 2019, sustainable finance is receiving more attention in both academic research and financial sector. Sustainable finance refers to the process of taking environmental, social and governance (ESG) considerations into account when making investment decisions. Environmental considerations might include climate change mitigation and adaptation as well as the preservation of biodiversity, pollution prevention and the circular economy. Leading asset managers and investment companies offer ESG financial products that take sustainability factors into account throughout the entire investment process. The United Nations and the European Commission are actively encouraging governments to use public-private partnerships (PPPs) in infrastructure for sustainable development and poverty alleviation, mindful of the limited resources available to governments to meet the huge development challenges of the era. Green bonds give investors an innovative way of supporting clean energy, mass transit, and other low-carbon projects that can help countries adapt to and mitigate climate change.

In most of the world, PPPs still rely heavily on bank lending as a part of their financial structure. However, considering Basel III and the ensuring EU Directives and similar legislation in the separate countries, the underlying volatility of banks' lending policies can make the cost of financing prohibitive, especially during market stress and extensive bank deleveraging. Project green bonds have the potential to bridge this funding gap. Investors are attracted by projects with a stable revenue stream. In addition, through green bonds they can get exposure to sectors that would be difficult to achieve through mainstream financial instruments. However, for green PPP projects to be bankable in the first place, legal, political, commercial and financial risks need to be appropriately allocated between public and private parties. Moreover, the deal structure has to be based on long-term stable revenue streams that extend over 10 to 30 years. Structuring PPPs is therefore a particularly challenging task since future revenue streams are notoriously difficult to forecast. This makes the need and the potential for green bonds particularly valuable for financing infrastructure.

The paper analyses the green project bonds as an alternative way to finance sustainable public-private partnerships. It reveals the key characteristics of bond financing and argues about some issues, pitfalls, and risks in using project bonds as a financial tool in designing and completion of PPP projects. Priority is given to the role and significance of green bonds in the financial structure of the PPPs. Desk research has been applied in the analysis, based on available external and internal sources. Data from scientific literature, international organizations (WB, UNDP, OECD, WEF, EU, etc.), and NASDAQ have been used. The results clearly indicate that the project green bonds became a sustainable investment opportunity. Engaging the capital markets for green PPPs they became an effective mechanism to finance a cleaner and resilient world.

Keywords: green bonds, green finance, sustainable PPPs, green capital markets, green banks.

Sažetak: U svetlu krize COVID-19 koja je počela 2019. godine, održivim finansijama se pridaje više pažnje u akademskim istraživanjima i u finansijskom sektoru. Održivo finansiranje se odnosi na proces uzimanja u obzir ekoloških, društvenih i upravljačkih (EDU) razmatranja prilikom donošenja odluka o investiranju. Razmatranja životne sredine mogu uključiti ublažavanje klimatskih promena i prilagođavanje, kao i očuvanje biodiverziteta, prevenciju zagađenja i cirkularnu ekonomiju. Vodeći menadžeri aktiva i investicione kompanije nude EDU finansijske proizvode koji uzimaju u obzir faktore održivosti tokom celog procesa ulaganja. Ujedinjene nacije i Evropska komisija aktivno podstiču vlade da koriste javno - privatna partnerstva (JPP) u infrastrukturi za održivi razvoj i ublažavanje siromaštva, imajući na umu ograničene resurse koji su dostupni vladama da odgovore na ogromne razvojne izazove tog doba. Zelene obveznice daju investitorima inovativan način podrške čistoj energiji, masovnom tranzitu i drugim projektima sa niskim sadržajem ugljenika koji mogu pomoći zemljama da se prilagode i ublaže klimatske promene. U većem delu sveta, JPP se još uvek u velikoj meri oslanjaju na bankarske kredite kao deo svoje finansijske strukture. Međutim, uzimajući u obzir Bazel III i direktive EU o obezbeđivanju i slično zakonodavstvo u odvojenim zemljama, osnovna volatilitnost kreditnih politika banaka može učiniti troškove finansiranja previsokim, posebno tokom stresa na tržištu i ekstenzivnog razduživanja banaka. Projektne zelene obveznice imaju potencijal da premoste ovaj finansijski jaz. Investitore privlače projekti sa stabilnim tokom prihoda. Pored toga, preko zelenih obveznica mogu doći do izloženosti sektorima što bi bilo teško postići putem mejnstrim finansijskih instrumenata. Međutim, da bi zeleni JPP projekti bili isplativi na prvom mestu, pravni, politički, komercijalni i finansijski rizici moraju biti na odgovarajući način raspoređeni između javnih i privatnih strana. Štaviše, struktura posla mora da se zasniva na dugoročnim stabilnim tokovima prihoda koji se protežu na 10 do 30 godina. Strukturiranje JPP-a je stoga posebno izazovan zadatak pošto je buduće tokove prihoda izuzetno teško predvideti. Ovo čini potrebu i potencijal za zelenim obveznicama posebno vrednim za finansiranje infrastrukture.

U radu se analiziraju zelene projektne obveznice kao alternativni način finansiranja održivih javno-privatnih partnerstava. On otkriva ključne karakteristike finansiranja obveznicama i raspravlja o nekim pitanjima, zamkama i rizicima u korišćenju projektnih obveznica kao finansijskog alata u dizajniranju i završetku projekata JPP. Prioritet se daje ulozi i značaju zelenih obveznica u finansijskoj strukturi JPP. U analizi je primenjeno kabinetsko istraživanje na osnovu dostupnih eksternih i internih izvora. Korišćeni su podaci iz naučne literature, međunarodnih organizacija (WB, UNDP, OECD, WEF, EU, itd.), NASDAQ. Rezultati jasno pokazuju da su zelene obveznice projekta postale održiva prilika za ulaganje. Angažovanjem tržišta kapitala za zelena JPP, oni su postali alternativni efikasan mehanizam finansiranja čistijeg i otpornijeg sveta.

Ključne reči: zelene obveznice, zeleno finansiranje, održiva JPP, zelena tržišta kapitala, zelene banke.

INTRODUCTION

COVID-19 crisis has changed dramatically the global economic picture. It forced the international organizations, national governments and companies to implement diverse measures in an attempt to curtail the pandemic and support the economy (Vassileva, Simić, 2021, p. 335). As many countries turn to debt to help their green recoveries from the coronavirus pandemic in recent times, an increasing number of governments and companies are looking for sustainability-focused financial instruments to fund major projects (Vassileva et al., 2020, p. 594). Moreover, the development of financial instruments such as green bonds linked to PPP projects can attract substantial institutional and private investments. PPPs implementing innovative technologies with strong environmental performance and financial returns, have been struggling to find debt financing.

PPPs are usually based on project finance using debt, equity and sometimes mezzanine capital. Innovative solutions developing new financial instruments and institutions such as green bonds, green funds and green banks, have also been included.

According to the Climate Policy Initiative (2017), private sector investment has taken the largest share in climate finance over recent years and project developers have consistently been driving the largest volume of private finance (Dharish, Anbumozhi, 2018, p. 6). While the share of more traditional lenders in the green climate financing mix signals a maturing technology market, more commercial finance institutions are taking a larger role, with institutional investment growing rapidly. The general trend suggests the need for dedicated green finance institutions to leverage private finance that can help close the funding gap for many low-carbon investments, especially in developing countries. With the private sector alone being unable to mitigate externalities and monetize, many green investments through PPPs often require the support of Green Investment Banks (GIBs). Hybrid financing schemes are increasingly common as projects become more complex and are not viable purely based on private financing structures (OECD, 2014). Green technologies must develop an equitable risk allocation framework that can provide a compelling argument for different stakeholders to support these

investments through subsidized financing to the extent that this financing is justifiable from a good public perspective. GIBs and similar entities have been established at national level (Australia, Japan, Malaysia, Switzerland, the UK), state level (California, Connecticut, Hawaii, New Jersey, New York, and Rhode Island in the US), and city level (Masdar in the United Arab Emirates (Dharish, Anbumozhi, 2018, p. 5).

1. MATERIAL AND METHODS

When analysing the role of the green project bonds as an alternative strategy in the PPPs it is helpful to introduce some key concepts and terminology. Green finance encompasses all the initiatives taken by private and public sectors (e.g., businesses, banks, governments, international organizations, etc.) in developing, promoting, implementing, and supporting projects with sustainable impacts through financial instruments. In other words, green finance provides the financial tools required by active agents to increasingly generate activities with positive and durable externalities. The United Nations, EU, OECD and other international organizations are actively encouraging governments to use green PPPs in infrastructure for sustainable development and poverty alleviation, mindful of the limited resources available to governments to meet the huge development challenges of the era. Some examples of green public-private projects are but not limited to the promotion of renewable energies, energy efficiency, water supply, water sanitation, environmental pollution, transportation, industrial pollution, climate change, deforestation, etc. Green bonds as specific financial instruments are intended to encourage sustainability and to support climate-related or other types of special environmental projects.

The paper analyses the green project bonds as an alternative way to finance sustainable public-private partnerships (PPPs). It reveals the key characteristics of bond financing and argues about some issues, pitfalls, and risks in using project bonds as a financial tool in designing and completion of PPP projects. Priority is given to the role and significance of green bonds in the financial structure of the PPPs.

Desk research has been applied in the analysis, based on available external and internal sources. Data from scientific literature, international organizations (WB, UNDP, OECD, WEF, EU, etc.), and NASDAQ have been used. The results clearly indicate that the project green bonds became a sustainable investment opportunity. Engaging the capital markets for green PPPs they became an alternative way to finance a cleaner and resilient world.

2. RESULTS AND DISCUSSION

2.1. *The increasing role of green finance and sustainable PPPs*

Green finance is important as it promotes and supports the flow of financial instruments and related services towards the development and implementation of sustainable business models, investments, trade, economic, environmental and social projects and policies (Fleming, 2020). As the financial sector plays a key role through its intermediary functions and risk management in advancing sustainable economic development while directing investment to the real economy, the intertwinement of these two is crucial.

Moreover, based on the lessons learned from the Covid-19 crisis, the availing of the global warming and the need for more sustainable business practices, green finance Initiatives have also been addressing the 2030 Sustainable Development Goals (SDG's) Agenda by emphasizing the shift of focus from shareholders' value creation (economic) to the generation of stakeholders' value (economic, environmental, and social) (Vassileva, Simić, 2021, p. 336). Green finance represents the future of the financial sector through innovative financial mechanisms and by supporting the investments in projects with sustainable instruments (Henry, 2021).

Green public-private initiatives appeared to be one of the contemporary investment solutions. The United Nations, EU, OECD and other international organizations are actively encouraging governments to use PPPs in infrastructure for sustainable development and poverty alleviation, mindful of the limited resources available to governments to meet the huge development challenges of the era (UN, 2016; EC, 2017; OECD, 2012). In many cases, the EU gives priority to projects that include PPPs, for example, in the construction of industrial zones, photovoltaic parks, high-tech centres and others. With the major steps the EU is making on climate action there is much interest on how other financial instruments can push achievement of the Paris Agreement on Climate Change objectives. It is no wonder that the experts from the World Bank consider that "decades of global PPP thinking can be an excellent starting point" (Loschacoff, 2020). Green PPPs aim to provide public service delivery and, while they seek to benefit from mutually beneficial partnerships, they remain founded on public oversight. They therefore provide frameworks to ensure public leadership and accountability in tackling climate change, as well, while enabling the ownership of certain components of climate finance to be transferred to private hands. PPPs in climate finance can

be understood as interaction between public and private financial institutions for the delivery of a common goal, i.e., providing a public asset or service, in which the private party bears significant risk and management responsibility (Gardiner et al., 2015, p. 17).

Some innovative initiatives have been fostering the development of a deep green bond market. Green bonds are a type of fixed-income instruments that are specifically earmarked to raise money for climate and environmental projects. These bonds are typically asset-linked and backed by the issuing entity's balance sheet, so they usually carry the same credit rating as their issuers' other debt obligations. Dating back to the first decade of the 21st century, green bonds are sometimes referred to as climate bonds, but the two terms are not always synonymous. For instance, The Climate Bonds Initiative introduced international standards serving as a baseline to recognize and label green infrastructure projects. The methodology is built on clearly defined solar, wind, green building, and transport thresholds. It also establishes methodol-

ogies for efficiently measuring the results achieved from their implementation. Once a project has been certified as green, the bonds can receive the "green" label. These types of bonds are no different from any other regular project bond, sharing the same financial features but lacking the liquidity and benchmarks other, more mainstream, fixed-income instruments enjoy in capital markets (Ordonez et al., 2015, p. 2). Recourse is only to the project's assets and balance sheet which fits into the financial schemes of most of the PPPs.

The expansion of sustainable finance offerings mirrors the growth of the broader ESG finance market (NASDAQ, 2022). According to the Climate Bonds Initiative (CBI), total sustainable debt reached a record USD 1.2 trn in 2021. This was driven primarily by the green bond market, which hit a historic high of USD 517.4 bn, nearly doubling 2020's total of USD 270 bn. "Our analysis suggests that the green bond market annual issuance could exceed the USD 1 trillion mark by 2023, even if we are to see a more modest growth rate," pointed out the CBI (Basar, 2021).

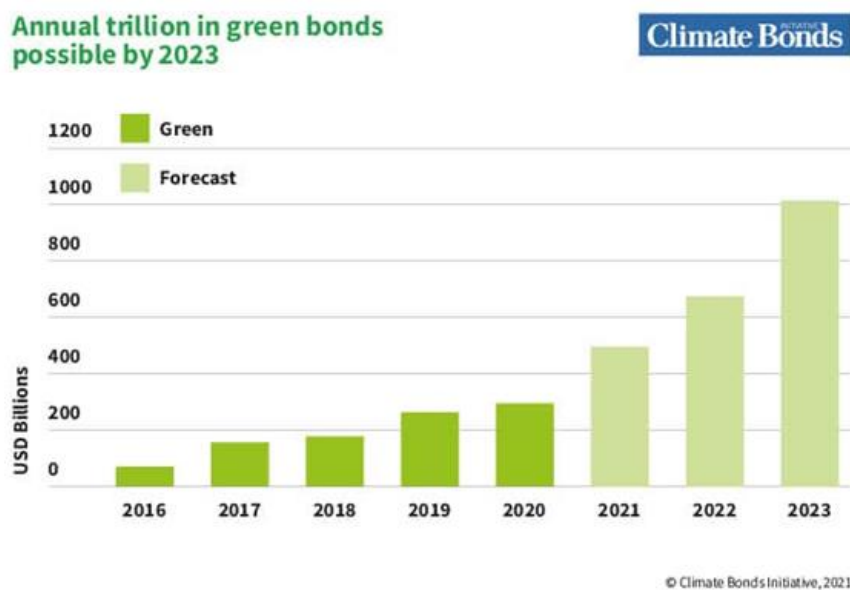


Figure 1 - Green bonds market

Source: <https://www.marketsmedia.com/green-bond-trading-adv-set-to-exceed-2020/> 10.03.2022

The World Bank is major issuer of green bonds. Through its investment arms IFC and IBRD it has issued over 160 green bonds in 22 currencies, totalling nearly USD 15 billion since 2008. World Bank Green Bonds support the financing of projects in member countries that meet specific criteria for low carbon and climate resilient growth, seeking to mitigate climate change or help affected people adapt to it. The types of eligible projects include

renewable energy installations, energy efficiency projects, and new technologies in waste management and agriculture that reduce greenhouse gas emissions and help finance the transition to a low carbon economy. They also support the financing of forest and watershed management and infrastructure projects that prevent climate-related flood damage and build climate resilience (Sagal, 2021).

2.2. Financial schemes of green PPPs

2.2.1. Methods of financing green PPPs

Like all the PPPs, green PPPs also bring together the skills and resources of both the public and private sectors and distribute the share of risks and responsibilities among the stakeholders. This enables governments to derive the gains from the expertise of the private sector and, most importantly, opens new sources of funds for the delivery of public services which otherwise could not have been funded due to shortage of capital or funds (WB, 2017).

Government funding

Traditionally, governments have funded most of the capital investment in the projects and brought in the private sector to achieve efficiency and value for money. This generally occurs when a government sources the civil works for the project through traditional procurement and then brings in a private company or consortium to operate and maintain the facilities or provide the service. Similarly, in build-operate-transfer and design-build-operate projects, the operator is paid a lump sum for completed stages of construction and then receives an operating fee to cover operation and maintenance of the project (Vassileva, Ignjatijević, 2020, p.30).

Corporate or on-balance sheet finance

In certain cases, the private participant may finance some of the capital investment for the project and raise the required investment through corporate financing - which involves getting finance for the project based on the balance sheet of the private operator. This mechanism is generally deployed when the cost of the financing is not significant or when the private participant is large enough to fund the project from its own balance sheet.

Project finance

Project finance is relatively poorly discussed in the economic literature, but in practice it is not a new mechanism. Its roots can be seen in the Commercial Law of ancient Athens (V century BC), which knows a similar phenomenon. It originated initially as a variant of the "buyer's loan", as it was intended for investment in the mining industry, mainly in developing countries, where the investor was not so interested in the chronic insolvency of the latter as debtors on the loan, as much as the economic efficiency of the specific project.

Project financing normally takes the form of limited recourse lending to a specially created project company (special purpose vehicle or "SPV") that has the right to carry out the construction and operation of the project. The SPV will be dependent on revenue streams from the contractual arrangements and/or from tariffs from end-users that will

only commence once construction has been completed and the project is in operation. It is therefore a risky enterprise, and before they agree to provide financing to the project the lenders will want to carry out extensive due diligence on the potential viability of the project and a detailed review of whether project risk allocation protects the project company sufficiently.

Funding under a B.O.T. (build-operate-transfer) for example, relies on the potential of the project, the revenues from its operation and the profit that is realized after its completion. Characteristic of this financing technique is the limited right of the creditor to recourse, most often up to the amount of the costs of bank servicing of the loan, due to commercial banks and other credit and insurance institutions participating in the operation (Vassileva, Ignjatijević, 2020, p. 26).

The distinctive features of project finance are as follows:

- a complete project is financed, determining for whom the revenues from its use are, and not the products that are produced or their market,
- includes several interrelated contracts with third parties - suppliers, customers and government agencies, which is particularly important for the provision of credit,
- the repayment of the loan is guaranteed by the revenues because of the operation of the project, according to the terms of the signed contracts and the calculations made, and not by the financial resources of the project itself; the applicability of these contracts and the reliability of settlements are more important to creditors than the creditworthiness of investors,
- investors, in turn, also rely on the perfect contractual framework, which is a sure guarantee to minimize risk and uncertainty.

Since the financial scheme is decisive for the PPP project, negotiations between investors, banks and financial advisers related to the project financial structure and documentation should start much earlier than normal for a conventional financial scheme. Negotiations for concluding the remaining contracts within the project follow their own algorithm, which is closely dependent on the sequence of activities specific to project finance.

2.2.2. Main financial flows

Naturally, capital is needed to build and put into operation any project. The green PPP projects are a way for the state to mobilize the private sector to invest in different areas using the following types of contributions (Ordonez et al., 2015, p.5):

Equity

Equity consists of cash contributions, shares, and property. It is characterized by the highest degree of risk. If a project proves profitable, the value of its fixed assets may exceed their initial capital value. This brings a certain profit to investors who participate with equity. In a BOT (build-operate-transfer) project, however, the fixed assets or the right to use them can be transferred to the state upon the expiration of the concession depending on the national legislation (Vassileva, Ignjatijević, p. 30). In these cases, the return on investors can appear only in the form of income generated during the operation of the site. Therefore, in the terms of contracts, there should be some premium for investors, as they are the bearers of the greatest risk.

Credit capital

Another financial flow is coming from loans. Usually, it is characterized by the lowest capital risk. This is understandable, given that the return on the loan is the interest on the loan, regardless of whether the project is profitable or not. The lower risk, respectively, corresponds to lower profits.

Investors who participate with property prefer the ratio debt-to-equity to be as high as possible, while creditors prefer it low. Such behaviour is justified in terms of the risks they carry. From the standpoint of the consortium implementing a project B.O.T. (build-operate-transfer), however, the higher the ratio, the more irrational its financial scheme are and the less its resistance to the dangers and threats of the business environment. There are no rules for determining the best debt-to-equity ratio. It depends on the specifics of the sector in which the PPPs are applied and on the specifics of the host country. Enough is to say that under normal conditions, the greater the risks, the lower it should be.

Bank guarantees / Letters of credit / Performance guarantees

Bank guarantees form an important part of project financing, allowing counter-parties immediate access to payment without the cost of locking up cash. Such guarantees may be "on demand" or only payable once the default is proven in court, adjudication, or arbitration. A bank issuing a guarantee, letter of credit or performance bond will fix the amount and obtain a counter indemnity from the customer, possibly secured against fixed or floating charges or cash deposits. The issuer will be entitled to convert the counter indemnity payments into loans or demand immediate repayment.

Mezzanine capital

The practice of international lending after the Second World War shows that in many cases hybrid

derivative financial instruments are used, which combine the characteristics of ownership and debt. Examples of mezzanine capital are subordinated debt and preference shares. The claims for the parties in the B.O.T. project (build-operate-transfer), providing mezzanine capital to the investor, are greater than the claims of those who provide ordinary credit resources. This implies a higher return, which includes not only interest on the loan but also a share of the project's profit. There are other mechanisms for premium risk of so-called mezzanine providers, but they are used less frequently. The main sources of this type of capital are commercial banks, venture funds, investment trusts and insurance institutions.

Bond/Capital markets financing

Bond financing allows the borrower to access debt directly from companies and institutions, rather than using commercial lenders as intermediaries. The issuer sells the bonds to the investors. Rating agencies will assess the riskiness of the project and assign a credit rating to the bonds. This will signal to bond purchasers the attractiveness of the investment and the price they should pay. Bond financing generally provides lower borrowing costs, if the credit rating for the project is sufficiently strong (Ordóñez et al., 2015, p. 6). Rating agencies may be consulted when structuring the project to maximize its credit rating. Bond financing provides a number of benefits to projects, including lower interest rates, longer maturity (which can be very helpful given the duration of most of these projects) and more liquidity.

The capital structure of a project, i.e., the complex mix of debt, property, and hybrid forms as well as financing from the capital market, is dictated by the interests of investors and creditors in terms of the allocation of risks among them.

3. PROJECT BONDS POTENTIALS, SHORTCOMINGS AND RISKS

The need for alternative means of financing has become even more pressing in recent years (Segal, 2021) as governments realized the potential of infrastructure investment as a mechanism to boost economic growth, especially in Europe's current recessionary economic environment.

At the same time, institutional investors, including pension funds and sovereign wealth funds, have recognized the appeal of infrastructure as a new asset class providing them with a long-term investment solution to match their long-term liabilities, and a unique way to diversify their portfolios from mainstream capital markets.

However, even these sophisticated investors are facing difficulties accessing this market due to

the limited investment opportunities and financial instruments available. The development of a secondary capital market even with offshore companies shows the commodification of the financial markets and the desire to find new ways and instruments to finance the projects. Project bonds, a more easily accessible and tradable security, can bridge the gap between capital markets and infrastructure projects. Through bond financing, issuers can achieve lower interest rates and longer maturities as opposed to bank financing. For investors, the appeal of project bonds is further enhanced by the current environment of weak returns on treasury and corporate bonds. Especially at the early stages, public sector support is essential to make project bonds more prevailing in financing infrastructure. While project bonds have a large untapped potential, challenges still exist that need to be overcome before their use can be more widespread.

Using project bonds schemes has many advantages and disadvantages which stems from their characteristics.

3.1. Basic characteristics of project bonds

Project bonds differ in many ways from more mainstream methods of financing infrastructure such as bank loans. These differences do not necessarily make them a riskier financing solution, but they suggest that procurers need to ensure that they have the required in-house expertise to understand the specifics of bond financing of green PPP projects and are prepared to meet the requirements of capital market involvement (Ordonez et al., 2015, p. 9).

Size: The size of the project largely determines whether project bonds can be considered et al as a means of financing. In general, a large issue size, for example more than EUR 100 million, is a requirement due to the inherent complexity of the structure but also to make the issue more attractive for investors. Very large issues can form the basis of public offerings reaching out to a wider range of investors and increasing liquidity. Otherwise, a private placement could also be an option involving only a few investors.

Investors: Institutional investors such as insurance companies, pension and sovereign funds are the main buyers of project bonds having the appetite and expertise needed for such long-term investments.

Costs: The costs involved in the preparation and implementation of bond financing are normally higher than that of bank financing. The additional costs originate from legal fees associated with meeting various regulatory requirements, preparing docum-

entation, and acquiring the credit rating for the issue. Higher costs are another reason why a larger deal size is crucial for bond financing.

Bankability: Not all infrastructure projects are financially bankable with appealing returns, but in some cases, they serve an important social and/or environmental purpose financed and maintained with government funding. On the other hand, projects using bond financing must be financially viable with a stable revenue stream that attracts the interest of capital market investors. If the project would otherwise fail to fulfil these criteria, it can also be achieved through credit enhancements.

Liquidity: Project bonds are generally tradable on secondary markets, which enable investors to exit their positions before maturity. In the case of bank financing, the loan originator has no or very limited possibility (for example through securitization) to take the loan off its balance sheet. Liquidity is an important advantage of bond financing, especially due to the long-term nature of infrastructure projects.

Time: Bond financing takes longer to implement than arranging financing through a bank. This is mainly due to the strict requirements of issuing a tradable security to the capital markets engaging regulators, credit rating agencies, underwriters and gauging investor interest and pricing the offer accordingly.

3.2. Risks in bond financing

While project bonds present several benefits and advantages, the inherent challenges should nevertheless be considered when choosing this route of financing infrastructural PPP projects. Project bonds are seen by some investors as one of the riskiest types of bond instruments. Others argue that they are less risky for the investors, especially when state authorities participate or there are some types of guarantees. This assessment is largely influenced by the fact that some particular risks exist in this asset class that the majority of capital market investors do not have the necessary expertise to evaluate and manage accordingly. Making investment decisions based solely on rating/yield without analysing the underlying project might not be a prudent approach to investing in this asset class (Ordonez et al., p. 10).

The procuring government authority needs to have the necessary expertise to adequately evaluate project bonds proposals, taking into consideration some of the unique risks in this type of structure. This refers especially to the projects in the EU with its strict regulations (Brühl, 2021). The fol-

lowing risks need extra attention in case of project bond financing:

Construction risk: Construction risks include cost overruns, longer than planned construction time, failure of the project to meet specific requirements and non-compliance with standards. The main causes could be aggressive budgeting and scheduling, bureaucracy, and lack of sufficient expertise of the contractor, among others. Investors require stringent security measures and guarantees to minimize construction risk. While construction risks can be contained with the appropriate safeguards in place, the involvement of more risk-averse investors can be encouraged by having two bond issues: one in the pre-construction phase with a short maturity and another one post-construction maturing at the end of the project. Investors unwilling to take on construction risk would invest only in the second issue.

Also, through a hybrid financing structure using both bank and bond financing at different stages of the project life cycle, construction risk can be excluded from the bond issue. In this case a bank loan covers the pre-construction financing needs of the project, thus taking advantage of the improved lending conditions and appetite of banks to source short-term loans. Post-construction financing is accomplished through a project bond issue with a lower yield compared to project bonds with construction uncertainties priced in.

Pricing risk: Similar to other fixed-income new issues, the final price of project bonds is only determined at issuance. Due to the inherent volatility in capital markets, the price which investors are willing to pay for an issue on one particular day, might change notably the next, resulting in pricing uncertainty during the financing process. As the procuring authority normally bears this risk, the involvement of financial experts at an early stage is strongly advised. While for bank financing the pricing risk is only created by the changes in the relevant reference rate, with project bonds any changes in both the reference rate and risk spread are a source of risk. With firm commitment, underwriting this risk can be transferred to the underwriters, in which case they would offer to purchase the entire issue size. Investment banks are normally hesitant to offer this service unless the deal is heavily oversubscribed confirming significant investor interest.

Other negative aspects: Through the sale of bonds at issuance procurers immediately receive the funding for the full life cycle of the project. As the construction process can last an extended amount of time this funding is used only gradually, possibly stretching over several years. However, the interest

payments on the bonds are due for the entire issue size from day one. Procurers invest the excess proceeds to partially cover their liabilities to investors, but the rate they receive is usually lower than what they have to pay on the bonds. This discrepancy is called the negative carry, affecting the bankability of the entire project. This has been considered a major barrier preventing project bond financing from becoming more widespread.

CONCLUSION

As countries continue their recoveries from the Covid-19 pandemic and seek to pursue carbon-neutral future, innovative sustainability-focused debt instruments such as the green bonds may prove to be attractive solutions for governments in many countries – from both a financial and a policy perspective. Although the EU (Germany, Sweden, Hungary, etc.), the USA and China are leaders on this front, the emerging markets are making considerable contributions. Emerging markets are harnessing environmental, social and governance (ESG) metrics to raise debt and fund major public-private projects and new business developments.

In contrast to other types of green bonds that raise money to fund environmentally friendly developments such as solar and wind power projects, green project bonds incentivise climate-positive solutions by incorporating a number of environmental objectives, along with a series of penalties for issuers if they fail to meet the goals. Summarising their positive and negative sides one might conclude that they can be used successfully in green PPPs to attract more institutional and private investments.

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