BRIDGING THE GAP: FINANCING THE CIRCULAR ECONOMY FOR SUSTAINABLE DEVELOPMENT IN CENTRAL AND EASTERN EUROPE

Nikolay Yordanov, PhD student
Associate prof. Dr Kamelia Asenova
University of National and World Economy

Abstract: *The adoption of a circular economy (CE) in Central and Eastern Europe (CEE) is a vital approach for achieving sustainable development. However, it has substantial financial obstacles, specifically in obtaining sufficient finance. This paper examines the function of green bonds as a fundamental financial tool to address the financing gap with respect to the CE in CEE. We analyze the current state of green bond markets in the region. By conducting research of green bond issuances, we investigate the effectiveness, difficulties, and future possibilities of green bonds in promoting the circular economy agenda. The results suggest that although green bonds have begun to acquire popularity, there are significant possibilities for expansion and improvement. The paper provides strategic ideas for policymakers, financial institutions, and enterprises to effectively utilize green bonds in expediting the shift towards a circular economy in CEE.*

Keywords: *Circular economy, Sustainable development, Green bonds, Financial instruments, Environmental finance, Investment transparency*
JEL: *G23, G28, Q01, Q56, Q58.*

1. Introduction

The concept of a Circular Economy (CE) has gained significant traction as a sustainable development model, especially considering the growing environmental concerns and resource constraints. A circular economy is an economic system that seeks to eradicate waste and promote the perpetual utilisation of resources. The Ellen MacArthur Foundation, a prominent authority on the concept of Circular Economy (CE), states that this model is founded on three fundamental principles: eliminating waste and pollution via design, promoting the continuous use of products and resources, and restoring natural systems (Ellen MacArthur Foundation, n.d.). This strategy starkly differs from the conventional linear economy, which adheres to a 'take, make, dispose' manufacturing model.

The implementation of a circular economy is of utmost importance in the Central and Eastern Europe (CEE) region. The region is confronted with a multitude of environmental difficulties, such as substantial waste production and resource inefficiencies, which are worsened by industrial remnants from previous eras. Implementing a circular economy in Central and Eastern Europe (CEE) has the potential to tackle these problems by encouraging the adoption of more environmentally friendly methods of production and consumption. The region must make this transition to achieve its sustainable development objectives and conform to the wider environmental policies of the European Union (EU), such as the European Green Deal and the Circular Economy Action Plan (McKinsey & Company, 2018).

Nevertheless, a significant financial hurdle poses as one of the main barriers to implementing a circular economy in the Central and Eastern European region (CEE). Implementing CE principles frequently necessitates substantial initial investment in innovative technology, infrastructure, and business models. The significant obstacle of this financial burden is particularly challenging in a place where access to financial resources is limited, and economic inequalities are prominent.

Green bonds have become an essential financial instrument to tackle this shortfall. Green bonds are financial products that are specifically designed to raise funds for projects related to climate and the environment. Investors are provided with the chance to contribute to sustainable development while also having the possibility to make a return on their investment. Green bonds have the potential to be crucial in raising the required funds to facilitate the shift towards a circular economy within the CEE region.

Although green bonds have the potential for growth, their market in Central and Eastern Europe (CEE) is still in its early phases. Several factors impact their development, including as legislative frameworks, market awareness, and the availability of appropriate projects. Furthermore, the impact of green bonds in advancing circular economy efforts is contingent upon their adherence to circular economy principles and the extent to which they finance pertinent projects.

By analysing the current state of green bond markets in the region, this research aims to evaluate their effectiveness, identify existing challenges, and explore future possibilities for enhancing their impact. This analysis intends to offer strategic advice to politicians, financial institutions, and firms on how to utilise green bonds more efficiently. The goal is to expedite the shift towards a circular economy in Central and Eastern Europe (CEE).

2. Problem Statement

Implementing a circular economy (CE) in Central and Eastern Europe (CEE) encounters substantial financial obstacles. The CE principles necessitate significant investments in cutting-edge technology, infrastructure, and inventive business models. Nevertheless, the financial environment in Central and Eastern Europe (CEE) is frequently marked by restricted availability of funds, economic inequalities, and undeveloped financial markets, posing challenges for enterprises and governments to obtain the required resources.

Conventional methods of financing have not been sufficient in closing this gap, which means we need to investigate new and creative financial instruments. An effective approach is the utilisation of green bonds, which are specifically tailored to generate financing for initiatives that promote environmental sustainability. The green bond market in Central and Eastern Europe (CEE) has not yet reached its full potential due to a lack of development. This is primarily caused by regulatory, market, and transparency difficulties that are impeding its growth and effectiveness. It is essential to tackle these financial difficulties to effectively carry out CE in the region, in line with the wider environmental policies and sustainable development goals of the European Union (EU).

3. Objectives of the Study

The objective of this paper is to elaborate on the basics of CE and green bonds and study the green bonds market in CEE with respect to the trends in generating financing to address the issues related to the financial obstacles in terms of financing ecologically friendly projects as well as implementation of a circular economy in Central and Eastern Europe. The study aims to evaluate the present state of green bond issuances in the region, encompassing market patterns and prominent participants. The study intends to provide strategic recommendations for policymakers, financial institutions, and entrepreneurs to better utilise green bonds, to facilitate the transition to a circular economy in Central and Eastern Europe (CEE).

4. Literature review

4.1. Circular Economy

The Circular Economy (CE) is a revolutionary shift from the conventional linear economic model of „take, make, dispose“. It adopts a regenerative strategy that aims to eliminate waste and pollution, maintain the utilisation of products and materials, and restore natural systems. The Ellen MacArthur Foundation (n.d.) states that the concept of CE is based on three fundamental principles (Ellen MacArthur Foundation, n.d.):

- By reevaluating the design process, companies can eliminate waste and pollution from the outset. This entails utilising materials that are readily disassemblable and recyclable, as well as creating goods with a focus on durability and ease of repair.
- The concept of Circular Economy (CE) emphasises the utilisation of long-lasting, reusable, and recyclable items to ensure that resources remain in circulation within the economy for an extended period. This includes activities such as repairing, remanufacturing, refurbishing, and recycling.
- Regenerating Natural Systems: Rather of wasting resources, the goal of CE is to restore and renew natural systems. This can entail the process of replenishing essential nutrients to the soil and establishing favourable conditions for the flourishing of ecosystems.

Kirchherr et al. (2017) present an extensive analysis of definitions of the circular economy (CE), emphasising its diverse characteristics and its origins in different theoretical frameworks, including cradle-to-cradle design, industrial ecology, and biomimicry. All these techniques have the same objective of reducing the negative effects on the environment by encouraging the use of sustainable resources and implementing creative business strategies.

The Significance of Circular economy for Sustainable Development

Implementing a CE is essential for attaining sustainable development. CE directly tackles several urgent environmental issues, such as the depletion of resources, the development of waste, and pollution. By adopting a circular model, economies can separate economic growth from resource consumption, thus fostering sustainability and resilience.

CE plays a crucial role in promoting sustainable development through the facilitation of innovation, improvement in resource efficiency, and generation of economic opportunities (Geissdoerfer, et al., 2017). The use of CE contributes to the achievement of the United Nations Sustainable Development Goals (SDGs), such as:

- **Goal 12:** Responsible Consumption and Production: Circular Economy (CE) advocates for the optimal utilisation of resources and the minimization of waste, in line with the objective of promoting sustainable patterns of production and consumption.
- **Goal 13:** Climate Action: CE contributes to the mitigation of climate change and the reduction of greenhouse gas emissions through waste reduction and the promotion of renewable resources.
- **Goal 14 and 15**, which focus on Life Below Water and Life on Land, are supported by Conservation and Environmental (CE) activities that involve minimising pollution and restoring natural systems. These practices play a crucial role in safeguarding marine and terrestrial ecosystems.

In the context of Central and Eastern Europe (CEE), the adoption of CE is particularly important. The area is confronted with substantial environmental obstacles, such as elevated rates of waste production and ineffective utilisation of resources. The European Environment Agency (2019) states that the industrial history of the region has resulted in a significant impact on the environment. Therefore, transitioning to a circular economy is not only desirable but also essential for achieving sustainable development.

By applying concepts of Circular Economy in Central and Eastern Europe, it is possible to address these environmental concerns effectively by encouraging the adoption of more sustainable patterns of production and consumption. The region must undergo this transition to achieve its sustainable development goals and conform to wider European Union (EU) regulations, such as the European Green Deal and the Circular Economy Action Plan. The European Green Deal has the objective of achieving climate neutrality in Europe by 2050. To facilitate this transition, the Circular Economy Action Plan provides a comprehensive framework that promotes the adoption of a circular economy in Europe. This plan aims to enhance Europe's global competitiveness, foster sustainable economic growth, and create new employment opportunities (European Commission, 2020).

Nevertheless, the implementation of CE in CEE is impeded by substantial financial obstacles. Implementing CE principles typically necessitates significant initial investments in cutting-edge technology, infrastructure, and innovative business models. Conventional methods of financing have for now been insufficient in closing this financial divide, underscoring the necessity for inventive financial instruments like green bonds. These bonds are specifically tailored to generate funding for environmental and sustainable projects, providing a possible alternative to facilitate the shift towards a circular economy in Central and Eastern Europe (CEE).

4.2. Green bonds

The early 21st century has seen a paradigm shift in global financial markets with an increasing focus on sustainable investments. Green bonds, as a key instrument in financing circular economy as well as the fight against climate change, have attracted considerable attention for their potential to mobilise resources for environmentally sustainable initiatives. A green bond is any type of bond instrument where the proceeds or an equivalent amount are used exclusively to finance or refinance, in part or in full, new and/or existing eligible green projects and which is consistent with the four core components of the Green Bond Principles (GBP) (The international capital markets association, June 2021 (with June 2022 Appendix 1)).

Green bonds are a widely acknowledged financial instruments that offer a creative approach to funding sustainable projects. The potential for utilising green bonds to advance sustainable development and address climate change in Central and Eastern Europe (CEE) is substantial, while there are currently certain constraints in place. Green bonds are financial instruments created expressly to fund initiatives that have positive environmental impacts. These bonds are issued by governments, corporations, or other entities to generate funds for projects that support sustainability, renewable energy, etc. Gaining insight into the historical background of green bonds is crucial for comprehending their significance within the financial industry.

Green bonds are a specialised type of financial instrument created to generate funding for projects that have a good impact on the environment. Green bonds frequently fund initiatives pertaining to renewable energy, energy efficiency, sustainable waste management, sustainable agriculture, and water resource management. The Green Bond concept was introduced by the European Investment Bank (EIB) in 2007, and the World

Bank adopted it in 2008. These initial endeavours established the groundwork for the swift growth of the green bond market, which is still developing. Green bonds, as per the definition provided by the Climate Bonds Initiative (CBI), are a distinct category of bonds that are exclusively utilised to fund or refinance projects that meet the criteria for being environmentally friendly, regardless of whether they are new or already in existence (Climate Bonds Initiative, 2022). The eligibility for these programmes is usually evaluated based on criteria that align with worldwide climate and sustainability objectives.

The development and progression of the green bond market

The green bond market has undergone substantial expansion and has broadened its reach and influence since its establishment. According to data from the Climate Bonds Initiative, the issuance of green bonds has surpassed $443 billion in 2022. The growth is attributable to the rising appeal of sustainable businesses among investors, as well as the backing provided by governments and international organisations. Factors contributing to this increase are as follows:

- **Regulatory support**: Governments and regulatory bodies worldwide have implemented guidelines and incentives to promote the issuance of green bonds. As an illustration, the European Union has established a green bond standard that provides a clearly defined framework for bond issuers, consequently enhancing transparency and bolstering investor trust.
- **Establishing a market infrastructure**, which includes organisations that certify and offer indexes for green bonds, is crucial for establishing norms and certifying the issuing of green bonds.
- Corporations and institutional investors are increasingly integrating **environmental, social, and governance (ESG)** criteria into their investment strategies, which is leading to a growing demand for green bonds. Increasing evidence suggests a correlation between ESG performance and financial performance.

Green bond financing in CEE countries not only boosts national competitiveness, but also contributes significantly to creating worldwide technological supremacy in sustainable innovation. The region stands to greatly benefit from this, as there is considerable opportunity for advancing research and development.

Green bonds primarily function as a means of funding projects that have a beneficial effect on the environment. This encompasses the mitigation of greenhouse gas emissions, enhancement of air and water quality, preservation of biodiversity, and sustainable management of natural resources. Green bonds commonly fund initiatives related to the utilisation of renewable energy sources, enhancements to infrastructure to reduce energy wastage, and the establishment of sustainable mobility options. These projects aim to mitigate the ecological footprint of economies in CEE and accomplish both domestic and worldwide environmental objectives.

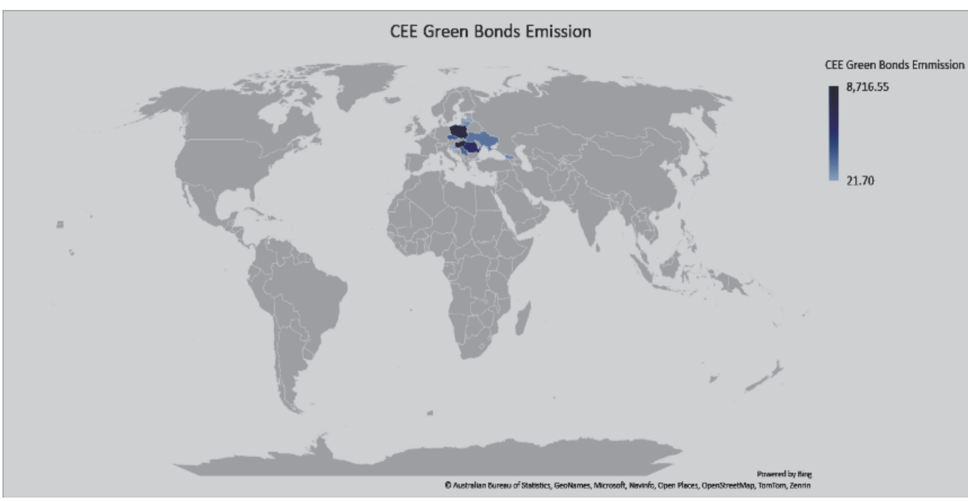
5. Development of the green bond market in Central and Eastern Europe

An analysis of the green bond issuance in CEE reveals a burgeoning market with notable disparities between 2017 and 2024, with all figures denominated in millions of USD. The recorded value in 2017 was USD 890 million, suggesting an increasing interest in environmentally focused financial instruments in the region.

In 2021, the volume of green financing expanded significantly to reach US$8,097 million. This growth can be attributed to a growing awareness of environmental issues, favourable policies, and the financial requirements of either major green or CE projects. In the subsequent year, the market experienced a fall to $4,335 million, which represented a reduction of almost 50% compared to the previous year's volume. The reported decrease aligns with global trends and can most likely be attributed to the COVID-19 pandemic. By 2023 and 2024, there is a notable economic rebound and a substantial rise in value, with figures reaching USD 4,522 million and USD 6,402 million respectively. This trend signifies a robust market that is committed to regularly investing in projects focused on sustainable development.

The variability in the issuance volumes underscores the susceptibility of the green bond market to various factors, including shifts in government environmental policies, international climate accords, overall economic patterns, and alterations in investor trust. The expansion of the green bond market in Central and Eastern European nations indicates a distinct transition towards funding approaches that advance environmental sustainability. This phenomenon aligns with the worldwide transition towards environmentally friendly economies and is crucial for comprehending the evolving landscape of sustainable finance and circular economy.

Figure 1. Total green bonds emissions in CEE



Source: FactSet database

The following analysis provides an investigation on the issue of green bonds in Central and Eastern Europe and its influence on economic development.

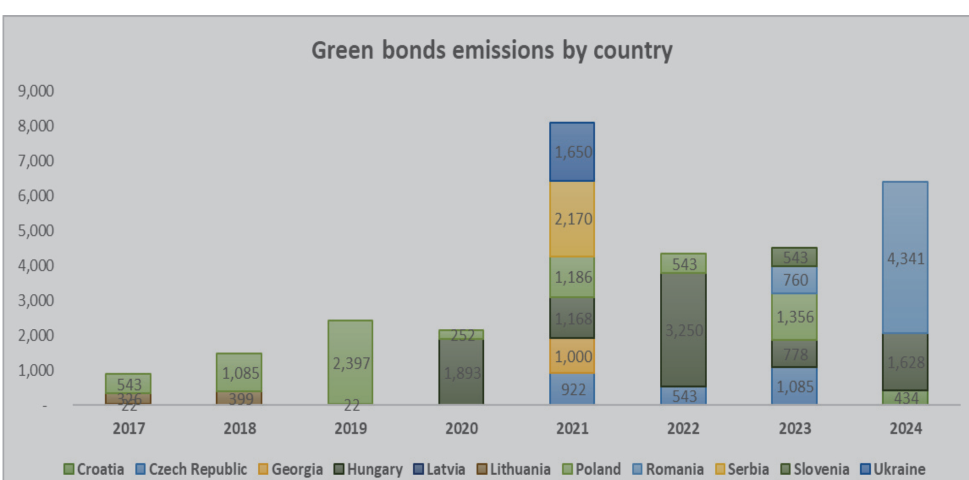
Analysis of green bonds emissions by countries

This paper analyses the issuance of green bonds in certain CEE nations between 2017 and 2024, highlighting the variations in sustainable finance across this heterogeneous region. The issuing of green bonds in Latvia and Lithuania indicates a tentative but cautious foray into the green bond market, highlighting the emerging involvement in green finance. In 2017, Latvia issued green bonds worth US$22 million, and Lithuania surpassed this in 2018 with an issuance of US$399 million. This indicates the initial growth of the green bond market in these economies. In 2019, the Polish market experienced a robust and consistent upward trend in the issuing of green bonds, reaching an impressive peak of USD 2,397 million. This may indicate a deliberate escalation in funding for substantial environmental initiatives, maybe in line with Poland's overarching climate and sustainability objectives.

Hungary's issuance trends exhibit a methodical strategy for entering and expanding in the market. Prior to 2020, there was a very low level of activity, however in 2022, a substantial surge in green bond issuance is observed, reaching a peak of USD 3,250 million. This signifies a purposeful utilisation of green funding strategies to tackle evolving environmental requirements on both a domestic and global scale. The discreet issuance operations observed in Serbia and Ukraine may indicate a deliberate effort to raise financing for specific projects related to the development of green infrastructure or to fit with global trends in sustainable finance. The Czech Republic's positive trend starting in 2021, characterised by consistent annual expansion, demonstrates the increasing acknowledgment and integration of green financing in the nation's budgetary strategies. The increase in popularity of green assets can be ascribed to regulatory developments and a growing sense of trust among investors. Romania's substantial involvement in the green bond market in 2023, coupled with a notable surge in 2024, suggests a purposeful transition towards green finance. This could suggest the commencement of several environmentally friendly initiatives or a change in overall economic strategy towards sustainable investment prospects. The inaugural bond issuances by Croatia and Slovenia in 2024 likely signify a delayed yet intentional acknowledgment of the significance of green financing, maybe driven by evolving government frameworks and market trends.

The available research indicates that the extent of involvement in the green bond market within a particular region is impacted by a combination of national strategies, capabilities, and macroeconomic factors. Statistics indicate that, although the market response was varied at first, there has been a substantial rise in the issuance of green bonds till 2024. This suggests a notable change towards financing approaches that support environmental sustainability.

Figure 2. Emissions of green bond in CEE by countries



Source: FactSet database

The divergence between corporate and sovereign issuance in the CEE green bond market has noteworthy consequences for sustainable development in the region. Corporate bonds demonstrate the corporate sector's commitment to sustainability, which is crucial for directing funds towards environmentally conscious initiatives. The act of sovereign issuance serves as a clear indication of the government's dedication to environmental objectives and the funding of projects that promote sustainable development.

The information offers an insight into the issuance of green bonds in the CEE region, differentiating between corporate and sovereign entities that issue them. Understanding the stratification is crucial for comprehending the fundamental factors and consequences of the expansion of the green bond market among various economic participants in these nations.

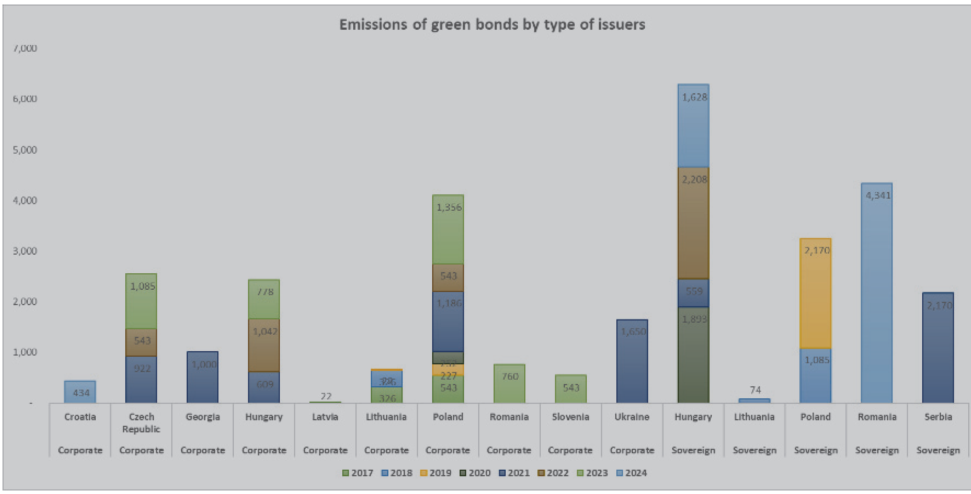
Corporate issuance in the Central and Eastern Europe (CEE) region demonstrates a steady and continuous involvement in environmentally friendly financial products. In 2017, Lithuania and Latvia initiated corporate bond offerings. Lithuania continued to have a consistent level of activity in both 2017 and 2018. Early corporate involvement may indicate a forward-thinking response from the business sector to the increasing need for environmentally friendly financing. This could be driven by a desire to fulfil corporate social responsibility goals or to gain a competitive edge in emerging green industries. In 2021, the corporate green bond market in Poland witnessed substantial expansion, with a total issuance amounting to USD 1,186 million. The rise seen suggests a market that is developing and reaching a more advanced stage, possibly encouraged by a favourable business climate and government measures that promote environmentally friendly projects.

The volume of corporate bonds issued by companies in the Czech Republic and Ukraine has increased significantly in recent years. Ukraine had a noteworthy single issuance of USD 1,650 million in 2020. These patterns indicate that intentional participants are intending to synchronise with the progression phases of significant environmentally friendly initiatives or shifts in corporate funding strategies.

Sovereign issuance denotes the direct participation of the government in green finance. In 2020, Hungary began issuing green bonds at the sovereign level, indicating a noticeable increase in this practice. By 2023, the country had issued a substantial amount of USD 2,208 million in green bonds. This entails harmonising domestic financial systems with the environmental objectives of the nation, potentially within a more comprehensive framework for promoting sustainability. The sovereign issuances of Poland and Serbia in 2019, amounting to USD 2,170 million each, indicate potential government initiatives to fund major public sector projects or fulfil international environmental commitments. In 2024, Romania entered the market by issuing a substantial amount of USD 4,341 million. This belated yet significant inclusion may indicate a change in policy towards environmentally friendly funding at the governmental level, potentially as a component of a comprehensive national plan to expedite Romania's shift towards sustainable practices.

The information reveals an intricate structure of green bond issuance in the CEE region, emphasising nuanced distinctions between corporate and sovereign entities, each of which make distinct contributions to the region's sustainable financing system. The data clearly demonstrates a significant rise in both market segments, suggesting a promising outlook for integrating environmental considerations into the financial strategies of commercial organisations and national governments in the CEE region.

Figure 3 Green bond emissions in CEE, by year of issue, country and issuer type



Source: FactSet database

6. Policy implications and recommendations

Green bonds are financial instruments specifically created to provide financial support for projects that promote environmental sustainability. These bonds have important policy consequences. The impacts arise from the influence of green bonds on creating the political agenda, influencing international relations, and affecting domestic political landscapes. The emergence of the green bond market has several notable policy implications, which can be described as follows:

- Investing in green bonds has a substantial impact on government policy objectives by emphasising the significance of sustainable development, environmental protection and thus circular economy. The issuance and investment in green bonds can incentivize governments to implement more stringent environmental rules, adhere to international climate agreements, and give priority to green initiatives in their budgets. This shift may result in an increased emphasis on sustainability in various sectors, including energy, transport, and infrastructure, which will influence policy choices aimed at decreasing carbon emissions and addressing climate change;
- Additionally, the global consequences of climate change and the international green bond market could have a substantial impact on international relations. Countries at the forefront of green bond issuance can enhance their influence by showcasing their commitment to environmental stewardship and sustainable financing approaches. Collaboration among nations regarding the regulations and investment in green bonds for environmentally sustainable projects can enhance diplomatic relations and advance global endeavours to tackle environmental issues;
- Green bonds serve as a means for countries to secure funding for their obligations outlined in international climate accords, such as the Paris Agreement. Green bonds facilitate the achievement of governments' Nationally Determined Contributions (NDCs) and other climate-related objectives by providing funding for initiatives that mitigate greenhouse gas emissions or enhance climate resilience;

- Additionally, the increasing popularity of green bonds has the potential to impact domestic political dynamics. Political parties or leaders supporting increased environmental laws could utilise the successful issuing of green bonds as evidence to bolster their argument. Opposition may emerge from sectors or political factions that perceive a threat to well-established industries, such as fossil fuels, because of the transition to green financing. Discussions over green bonds and associated policies have the potential to impact election results, party stances, and public opinions concerning environmental matters.
- Supporting green activities by issuing green bonds has the potential to expedite the shift towards a sustainable economy, which might have substantial policy ramifications. This transition may necessitate substantial modifications to industrial legislation, labour markets, and social assistance programmes to mitigate the impact on workers and communities reliant on high-carbon industry. Policy initiatives, such as the implementation of just transition policies, have the potential to impact social fairness and the allocation of economic advantages, thereby shaping voter conduct and public backing for environmental policy.

Investing in green bonds has substantial and diverse policy ramifications, encompassing legislative agendas, international diplomacy, national politics, and the broader shift towards a sustainable economic framework. Green bonds possess the capacity to incite political action regarding climate change, exert influence over policies and economic strategies, and impact conversations surrounding environmental matters by providing backing to initiatives that advance environmental sustainability. The expanding green bond market is anticipated to exert a significant influence on the policy framework, mirroring the increasing significance of climate change and sustainability in worldwide and domestic politics.

7. Conclusion

The green bond market in Central and Eastern Europe (CEE) is intricately connected to the general economic and sustainability situations in the region. CEE economies are projected to have varying growth rates as they rebound from inflation issues and want to take advantage of European Union funds and foreign direct investment. The anticipated growth will be driven by the enhancement of private consumption and investment. However, the forecast may be influenced by the performance of key trading partners, such as those in the euro area (Vartapetov, et al., 2023). Comprehending the economic backdrop is crucial for evaluating the feasibility of green bonds. The occurrence of economic recovery and the influx of investment can present opportunities for funding sustainable initiatives.

The region's dedication to sustainable development is emphasised by its emphasis on sustainability, especially considering the social and economic impacts of the COVID-19 pandemic. Governments and public sector institutions have a crucial responsibility in fostering the development of more resilient communities through sustainable recovery. Business continuity, supply chain interruptions, and financial market volatility are key factors that impact the green bond market. These factors shape investment priorities and financing for sustainable projects (PwC, 2023). By incorporating sustainability into strategic planning, advocating for sustainable infrastructure, and providing funding for sustainable growth, an environment that supports green finance is established. The increasing focus on digital technologies in the development and execution of sustainable initiatives, along with the establishment of a conducive framework for environmentally friendly financial investments, underscores the expanding prospects of the green bond market in the Central and Eastern Europe (CEE) region (PwC, 2023).

Economic projections and continuous sustainability initiatives suggest a conducive environment for the expansion of green finance, including green bonds. The region's economic rebound and strategic emphasis on sustainability demonstrate an increasing acknowledgment of green bonds as instruments for financing the shift towards circular economy. The viability of green bonds in Central and Eastern Europe (CEE) hinges on the region's ongoing economic revival, supportive policies, and efficient execution of sustainability initiatives.

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