CENTRAL BANKS' ROLE IN ADVANCING SUSTAINABLE FINANCE

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Abstract. *This paper examines the critical role of central banks in promoting sustainable finance within the context of global climate change challenges and the transition to a low-carbon economy. It analyzes various instruments and policies that central banks can employ to foster green finance and mitigate climate-related risks in the financial system. The study explores how central banks can integrate sustainability considerations into their core functions, including monetary policy, financial regulation, and supervision. Furthermore, the paper discusses the challenges central banks face in balancing their traditional mandates with emerging sustainability objectives and explores how the emerging sustainability-focused duties may impact the autonomy and answerability of central banking institutions. The study underscores the significance of collaboration among central banks, governments, and the private sector in ensuring an orderly and effective transition towards a sustainable economy. Finally, it offers policy recommendations for enhancing the role of central banks in advancing sustainable finance and addressing climate-related financial risks.*
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Introduction. Climate change represents a major global challenge of the 21st century, with significant implications for economies and societies worldwide. The international community has urgently recognized the need to address this issue, culminating in agreements such as the 2015 Paris Accord. In this rapidly evolving landscape, central banks find themselves facing a new challenge: adapting to the reality of climate change. As public awareness grows and global political commitment to combating global warming intensifies, these institutions are compelled to reevaluate their roles and responsibilities. We are witnessing a gradual transformation, with some pioneering central banks already integrating environmental considerations into their policies, from green finance to climate risk management.

This evolution is not without precedent. History shows that central banks have redefined their roles at crucial moments, such as the 2008 financial crisis, when financial stability became a priority. Now, in the face of the climate threat, a new stage in their evolution is emerging. The current debate centers on the extent to which these institutions should engage in promoting sustainability, balancing the imperative of climate action with the limits of their traditional mandates.

The financial sector plays a crucial role in facilitating the transition towards a sustainable, low-carbon economy. This sector faces multiple challenges, from developing new financial products to integrating climate risks into investment strategies. In this context, the Republic of Moldova is also taking important steps towards a more sustainable and energy-efficient economy. A concrete example is the recently approved World Bank project aimed at improving energy efficiency in public buildings and the district heating sector in Moldova (LEGKL, 2024).

The purpose of this article is to examine the role of central banks, particularly the National Bank of Moldova, in advancing sustainable finance and addressing climate-related financial risks. Key questions we aim to address include: How can central banks effectively integrate sustainability considerations into their core functions? What specific tools and policies can the National Bank of Moldova implement to promote sustainable finance? How can the balance between traditional central bank mandates and emerging sustainability objectives be achieved?

This research topic is gaining increasing importance, reflecting the urgency with which society seeks solutions to the climate crisis and the vital role that the financial sector can play in this global transition. By exploring these issues, we aim to contribute to the ongoing dialogue on sustainable finance and provide actionable insights for policymakers and financial institutions in Moldova.

Literature review. The evolving role of central banks in sustainable finance has become a focal point of academic research and policy discussions, with numerous scholars examining the various aspects of this complex and multifaceted issue. Dikau & Volz (2019, 2021) emphasize the crucial role of central banks in supporting the development of green finance models and ensuring accurate assessment of environmental and carbon risks by financial institutions. They argue that central bank involvement is not limited to passive incorporation of environmental factors into existing frameworks but extends to active engagement in sustainable financing practices. This perspective is also supported by PIERRE et al. (2022), who note a growing acceptance of the idea that central banks and financial supervisors should address climate-related concerns. Durrani et al. (2020) highlight the importance of central bank participation in initiatives such as the Network for Greening the Financial System (NGFS) and the Sustainable Banking Network (SBN), demonstrating their commitment to expanding sustainable financing practices. This aspect is reinforced by Khairunnessa et al. (2021), who emphasize the role of NGFS in analyzing and managing climate and environment-related risks in the financial sector.

Saratian & Arief (2018), as well as Chen et al. (2022) and Zheng et al. (2021), extend the discussion to the broader context of sustainable development, arguing that central bank involvement in sustainable financing contributes to achieving Sustainable Development Goals (SDGs) and transitioning to a green economy. Chamdani & Santoso (2023) discuss the concrete implementation of "green policies" by central banks, such as green versions of quantitative easing and support for environmentally friendly financial institutions through green bond purchases. Finally, Svartzman et al. (2020) underscore the importance of addressing climate change risks for monetary and financial stability, highlighting in particular the systemic financial risks presented by climate change in the transition to a low-carbon economy.The literature demonstrates a clear evolution in thinking about the role of central banks in sustainable financing. From an initially more cautious approach, there is a transition towards more active and complex involvement. This evolution reflects the growing recognition of the impact of climate change on financial stability and the need for a proactive approach from central banks. However, significant challenges remain in balancing these new responsibilities with the traditional mandates of central banks and managing potential conflicts of interest or unintended risks. It is crucial for central banks to continue exploring and refining their approaches to sustainable financing while maintaining a balance between environmental objectives and long-term financial stability.

In conclusion, the theoretical framework for the role of central banks in sustainable financing combines classical economic theories with newer concepts from the field of sustainability and finance. The literature in this field is dynamic and continually evolving, reflecting the complexity and urgency of challenges related to climate change and sustainability in the global financial system.

Research methodology. This study employs a mixed-methods approach to examine the role of central banks in advancing sustainable finance. The methodology combines qualitative analysis of policy documents and literature with quantitative assessment of central bank initiatives and their impacts. This methodology allows for a comprehensive examination of central banks' role in sustainable finance, combining theoretical insights with practical examples and expert perspectives. The mixed-methods approach provides a nuanced understanding of both the policy landscape and the real-world impacts of central bank initiatives in this rapidly evolving field.

Main results. Central banks' involvement in sustainable finance has undergone a significant evolution in recent decades, reflecting an increasing awareness of the importance of environmental factors in global financial stability. This transformation can be analyzed in several distinct stages, each marking an important advancement in the financial sector's approach to environmental challenges. The initial stage, in the 1990s, was characterized by the first efforts to recognize the link between finance and sustainability. The creation of the United Nations Environment Programme Finance Initiative (UNEPFI) in 1990 marked the beginning of this global awareness (Fufa, 2024). his initiative laid the groundwork for future actions of central banks in the field of sustainable finance.

In the 2000s, we witnessed a transition towards the concrete implementation of environmental policies in the banking sector. The People's Bank of China (PBC) played a pioneering role in this regard, issuing a notification in 1995 that required financial institutions to consider environmental factors in their credit policies (Liu & Tobias, 2023). This step was followed by the publication of the "Green Credit Guidelines" in 2012, which mandated financial institutions to adjust credit decisions to address environmental risks and support green growth (Wang & Wang, 2023).

Figure 1 provides a visual timeline of key events and initiatives in the evolution of central banks' involvement in sustainable finance from 2015 to 2024, illustrating the rapid progression of developments in this field.

The mid-2010s marked an intensification of efforts and a broader recognition of climate risks to financial stability. Mark Carney's "Breaking the Tragedy of the Horizon" speech in 2015 was a turning point, drawing attention to the urgent need to address climate risks in the financial sector (Carney, M., 2015). This speech catalyzed a series of global initiatives, including the creation of the Network for Greening the Financial System (NGFS) in 2017, which marked the beginning of international collaboration between central banks on the topic of sustainable finance (One Planet Summit, n.d.).

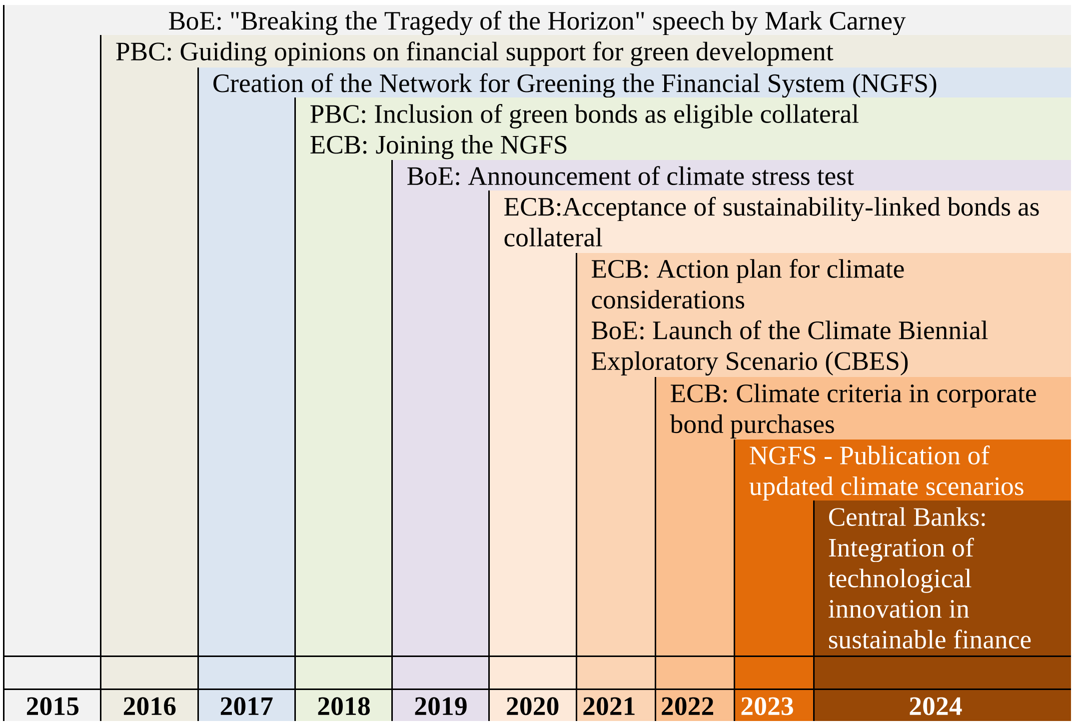

Figure 1. **Evolution of Central Banks' Involvement in Sustainable Finance (2015-2024)**
Source: Author's elaboration based on sources cited in bibliography

The period 2018-2021 was characterized by an acceleration of concrete actions. Central banks began to integrate environmental considerations into their core operations. For example, the People's Bank of China included green bonds as eligible collateral for its lending facilities (Macaire & Naef, 2021), while the European Central Bank (ECB) began accepting sustainability-linked bonds as collateral for refinancing operations. During the same period, the Bank of England (BoE) announced plans for the first comprehensive climate stress test.

Recent research highlights the transformative role of central banks in promoting a sustainable future (Tashtamirov, 2023). A 2021 study showed that while only 12% of central banks have explicit sustainability mandates, 40% are mandated to support government policy priorities, including sustainability objectives (Dikau & Volz, 2021). In recent years, we are witnessing an ever-deeper integration of sustainable finance into central bank practices. Technological innovation plays a crucial role in this transformation, contributing significantly to sustainable financial performance (Serdarušić, 2024). Central banks are not only promoting green finance but are beginning to incorporate it into the very structure of their operations, from monetary policy to banking supervision.

Consequently, through collaborative efforts and strategic interventions, central banks play an essential role in shaping a more sustainable future for the financial sector and the global economy. The evolution of their involvement in sustainable finance reflects a growing recognition of the importance of integrating ESG factors into financial policies and practices.

Central Bank Initiatives for Driving Sustainable Finance. Central banks' efforts in the field of sustainable finance are grounded in the fundamentals of modern economic theory and the expansion of the traditional role of monetary policy, particularly in the context of global challenges such as climate change. The theory of externalities, initially developed by economist Arthur Pigou in the early 20th century, provides a robust justification for central bank intervention in correcting market failures related to climate change (McClure & Watts, 2016). Pigou argued that negative externalities, such as pollution, require government intervention to address market failures, suggesting the implementation of production taxes to internalize these external costs (Decker, 2019; Fleurbaey et al., 2021).

In the current context, there is growing recognition of the need for central bank intervention to address market failures associated with environmental externalities (Antoine et al., 2020). Climate-related risks have been identified as a significant concern for central banks, impacting financial stability (Antoine et al., 2020; Dikau & Volz, 2021). Scholars advocate for the integration of climate-related risks into central banks' policy frameworks to ensure macro-financial stability (Dikau & Volz, 2021; Wołoszczenko-Hołda, 2022).

Moreover, the concept of the "tragedy of the horizons" introduced by Mark Carney, former Governor of the Bank of England, underscores the need for central banks to address long-term risks associated with climate change, even if these extend beyond traditional economic and political cycles. This approach aligns with the broader objective of rectifying market failures and promoting efficient resource allocation (Fleurbaey et al., 2021; Boneva et al., 2021). By incorporating Pigouvian principles in addressing climate change, central banks can play a crucial role in promoting sustainability and mitigating risks associated with environmental externalities. Post-Keynesian monetary theory and Richard Werner's "credit guidance" concept suggest central banks can influence capital allocation towards sustainable investments (Werner, R., 2005). Recent literature explores the role of banking and monetary policy in financing low-carbon transitions, the impact of monetary policy on green finance, and the complex role of central banks in promoting sustainable development through green banking practices.

In this context, central banks expand their traditional mandate to include sustainability, aiming to redirect financial flows towards sustainable investments, integrate climate risks into the financial system, and support green financial product development. Building on these theoretical foundations, central banks' efforts aim to redirect financial flows towards sustainable investments, integrate climate risks into the financial system, and support the development of green financial products. These actions manifest through various instruments and initiatives, such as:

1. **Incorporating climate risks:** Central banks integrate climate-related risks into their policy implementation frameworks, contributing to the protection of macro-financial stability (Dikau & Volz, 2021).
2. **Sustainability criteria:** Establishing sustainability criteria for lending activities and investment portfolios (Abuatwan, 2023).
3. **Participation in international initiatives:** Central banks engage in networks such as the Central Banks and Financial Supervisors Network for Greening the Financial System (NGFS) to expand sustainable financing practices (Durrani et al., 2020).
4. **Policy frameworks for green financing programs:** Offering refinancing programs under favorable conditions, credit allocations to financial enterprises, and sector-specific transformation projects (Azad et al., 2022).
5. **Development of Green Banking (GB):** The example of Bangladesh Bank (BB) illustrates the implementation of green finance through the development of Green Banking, considered crucial for the transition to a green economy and achieving the Sustainable Development Goals (Chen et al., 2022).
6. **Green transformations in internal operations:** Banks and non-bank financial institutions adopt green financing mechanisms and implement green transformations in their internal operations (Khairunnessa et al., 2021).
7. **Modifying regulatory frameworks:** Central banks in the Asia-Pacific region are modifying regulatory frameworks to encourage green lending and products (Durrani et al., 2020).
8. **Supporting green financing programs:** In Vietnam, major banks such as HSBC, Deutsche Bank, Société Générale, and BNP Paribas have initiated green financing programs with the support of central banks (Nguyen et al., 2022).

9. **Integrating digital transformation:** The concepts of "green Fintech" and "sustainable digital finance" are promoted to maintain environmental objectives and promote sustainability (Serdarušić, 2024).

10. **Policies to stimulate green innovation:** In China, the central bank accepts green bonds rated AA or higher as eligible collateral assets, thus encouraging green innovation and supporting the green transformation of enterprises (Wang & Wong, 2023).

The diverse array of instruments and initiatives employed by central banks to promote sustainable finance can be categorized into several key areas (see figure 2). This classification not only provides a structured view of current efforts but also allows for future expansion and refinement as the field of sustainable finance evolves.

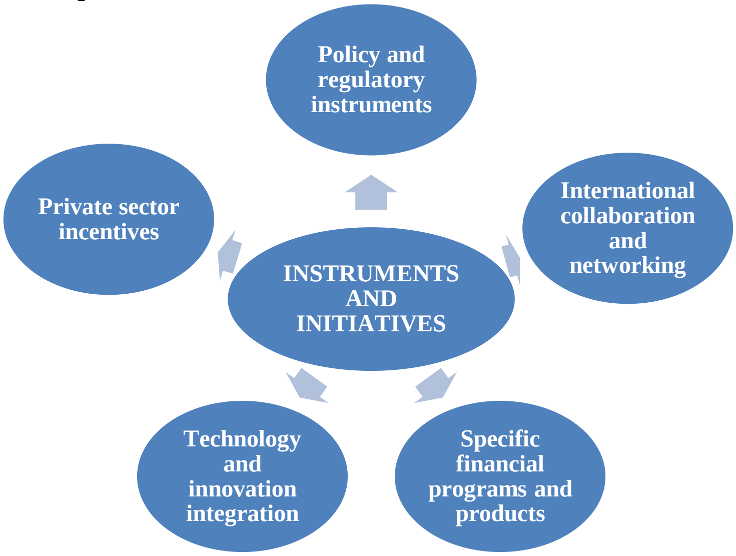

Figure 2. **Classification of Central Banks' instruments and initiatives for promoting sustainable finance**

Source: Author's elaboration based on sources cited in bibliography

Policy and Regulatory Instruments: This category encompasses a range of tools that central banks use to shape the financial landscape. It includes the incorporation of climate risks into policy frameworks, the establishment of sustainability criteria for lending and investment, the development of green financing policy frameworks, and the modification of existing regulatory structures. These instruments form the backbone of central banks' efforts to integrate sustainability into the core of financial operations.

International Collaboration and Networking: Recognizing the global nature of climate challenges, central banks actively participate in international initiatives. Networks such as the NGFS play a crucial role in sharing best practices and coordinating efforts across borders.

Specific Financial Programs and Products: This category highlights the practical implementation of sustainable finance principles. It includes the development of Green Banking practices, green transformations in internal operations, and support for specific green financing programs. These initiatives demonstrate how sustainable finance principles are being translated into tangible financial products and services.

Technology and Innovation Integration: As the financial sector rapidly digitalizes, central banks are exploring the intersection of technology and sustainability. The promotion of concepts like "green Fintech" and "sustainable digital finance" represents an exciting frontier in sustainable finance.

Private Sector Incentives: Recognizing the crucial role of the private sector in driving sustainable development, central banks are implementing policies to stimulate green innovation. These incentives aim to encourage businesses to align their operations with sustainability goals.

It's important to note that this classification is not exhaustive and may evolve as new challenges emerge and innovative solutions are developed. The field of sustainable finance is dynamic, and central banks continue to adapt their approaches to meet emerging needs and opportunities. Future developments may introduce new categories or refine existing ones, reflecting the ongoing commitment of central banks to promoting a more sustainable financial system.

Monetary, Regulatory and supervisory measures of CB. The tools and initiatives of central banks in the field of sustainable finance are interconnected and complement each other. Figure 3 presents a schematic overview of the main areas of action for central banks, which can be divided into three major sections: monetary policy, regulation and supervision, and research and education.

These areas overlap with each other, highlighting how the various instruments and measures from each category interact. For example, in the intersection between monetary policy and regulation/supervision, we find instruments that combine elements from both domains, such as adjusting the eligibility criteria for collateral assets to favor green bonds, as the European Central Bank did in 2020 (Schoenmaker, D., 2021), or linking capital requirements to green financing activities, exemplified by the Hungarian Central Bank's program for green mortgage loans (CBH, 2022).

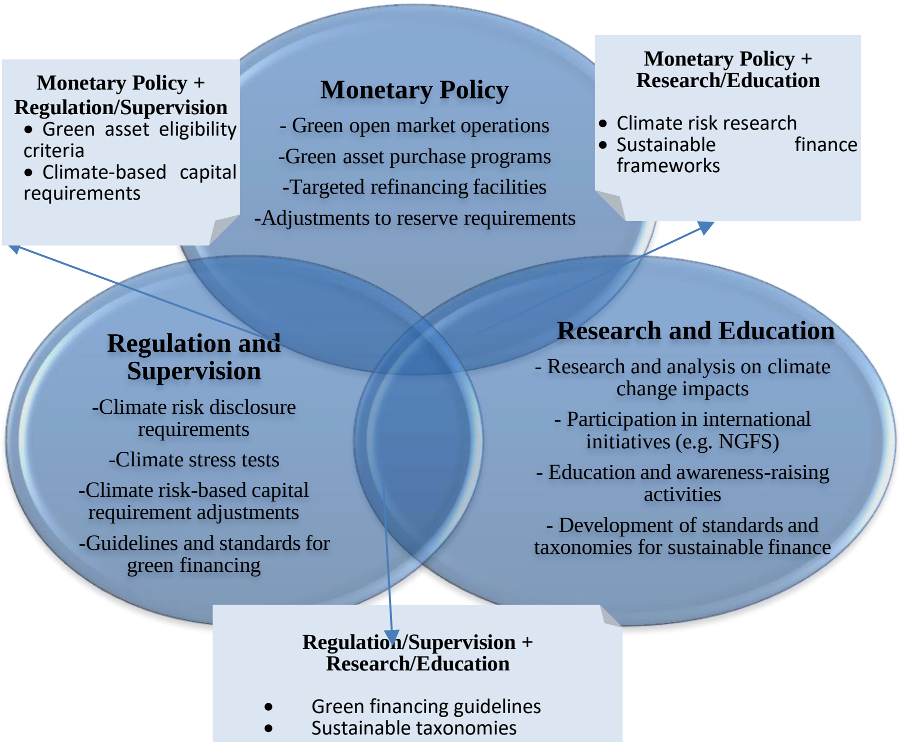

Figure 3. **Central banks' sustainable finance toolkit**

Source: Author's elaboration based on sources cited in bibliography

Furthermore, the overlap between monetary policy and research/education highlights initiatives through which central banks use monetary policy instruments to support research activities, analysis, and awareness-raising regarding climate-related risks, such as the publication of impact studies by central banks or participation in international networks like Network for Greening the Financial System (NGFS).

Finally, the intersection of the regulation/supervision domain with research/education reflects measures through which sustainability considerations are integrated into the regulatory framework, such as climate risk disclosure requirements or climate stress tests introduced by the Bank of England, alongside promoting understanding and knowledge exchange among market participants through educational programs and standards development (BoE, 2022).

This representation emphasizes that central banks' efforts to promote sustainable finance involve a complex and coordinated approach, in which the various components of their toolkit intertwine and reinforce each other to generate a positive impact on the transition to a sustainable economy.

Central banks have a wide range of tools at their disposal to promote sustainable finance, from monetary policy adjustments to regulatory measures and research activities. The effective use of these instruments can significantly impact redirecting financial flows towards sustainable activities and strengthening the financial system's resilience to climate risks. However, implementing these measures requires a balanced approach that considers the traditional mandates of central banks and potential side effects on financial and economic stability.

As the field of sustainable finance continues to evolve, central banks will likely refine and expand their toolkit, developing new approaches to address emerging challenges and opportunities in the transition to a more sustainable economy.

Discussion and conclusions. The integration of sustainability objectives into the operational framework of central banks represents a complex and multidimensional challenge that requires a nuanced and strategic approach. This transformation involves reconciling potential short-term tensions between sustainability and price stability, as well as a fundamental reassessment of the concept of financial stability to incorporate long-term climate risks. In this context, central banks face the delicate task of managing public and political expectations while maintaining their operational independence and institutional credibility.

The effective implementation of sustainable finance policies is hindered by a series of significant obstacles. These include the deficit of reliable and standardized data on climate risks, inherent uncertainties in modeling the long-term impact of climate change on the economy, as well as methodological difficulties in quantifying and integrating climate risks into existing financial paradigms. These challenges also represent opportunities for innovation in data analysis and the development of new risk assessment methodologies, thus stimulating the evolution of the entire financial sector towards a better understanding and management of climate risks.

A holistic approach to sustainability in the financial sector requires unprecedented coordination between central banks, governmental authorities, and other regulatory bodies. This collaboration must aim to align monetary and fiscal policies to facilitate the transition to a low-carbon economy, while managing potential tensions between national and global sustainability objectives. The opportunity lies in developing innovative cooperation mechanisms and integrated policy approaches that allow for concerted and effective action in the face of climate challenges.

Expanding the role of central banks in the sphere of sustainability raises fundamental questions about the independence and accountability of these institutions. There is a risk that increased involvement in climate policies could lead to a politicization of central bank decisions, thus undermining their operational autonomy. To counter these risks, it is imperative that central banks precisely define the limits of their involvement in sustainability policies, improve decision-making transparency, and develop new oversight mechanisms adapted to their expanded roles.

The role of central banks in promoting sustainable finance has evolved significantly in recent years, reflecting the growing recognition of the impact of climate change on financial and economic stability. By utilizing a wide range of instruments - from monetary policy to regulation and supervision - central banks have the potential to play a crucial role in facilitating the transition to a more sustainable economy.

However, this evolution is not without challenges. Central banks must strike a delicate balance between their new responsibilities in the sustainability domain and their traditional mandates, address limitations related to data and methodologies, and navigate a complex political and economic landscape.

The case studies presented in this article demonstrate that there are multiple paths of action for central banks, adapted to their specific contexts. Regardless of the chosen approach, it is clear that central banks will play an increasingly important role in shaping the future of sustainable finance.

Ultimately, the success of these efforts will depend not only on the actions of central banks but also on effective collaboration with governments, the private sector, and civil society. Only through a coordinated and comprehensive approach can we hope to effectively address the complex challenges of climate change and build a more resilient and sustainable financial system for future generations.

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