Green finance in Banking sector: analysis of green bonds in European banks

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ABSTRACT

Green finance offers economic and environmental benefits worldwide. Green finance increases access to environmentally friendly goods and services for individuals and businesses, balancing the transition to a low-carbon society and resulting in more socially inclusive growth. Green bonds have emerged as a crucial component of sustainable development. While previous studies have examined the role of financial institutions in sustainable finance, they have often been hindered by limited data availability. In our research, we conduct a comparative analysis of five European banks, focusing on their green bond issuance and highlighting the most significant projects funded through these bonds. Our findings reveal sectors within the green economy that have experienced notable growth, with a particular emphasis on the substantial increase in green bond issuance, particularly in the energy efficiency sector during 2021. The insights derived from our research not only assist market participants in making informed decisions but also provide valuable guidance to policymakers in promoting green finance. By shedding light on the achievements and impact of financial institutions in the realm of green finance, our study contributes to the advancement of both the market and policy landscape.

Keywords: Climate change; Environmentally infrastructures; European banks; Green finance; Green bonds.

1.Introduction

Climate change has become the dominant political and economic challenge of this century, and it is expected to remain so in the foreseeable future. Governments, investors, businesses, and individuals around the world are starting to take action in response to the climate crisis, particularly in adopting decarbonization methods. The transition to a low-carbon or green economy requires substantial amounts of new capital investment, particularly in the form of green financing. This financial support is crucial for promoting activities that reduce greenhouse gas (GHG) emissions and help companies adapt to the impacts of climate change (Barbu and Boitan, 2019).

Green finance is a comprehensive term that encompasses financial investments directed towards sustainable development projects, initiatives, environmental products, and policies aimed at fostering a more sustainable economy. While it includes climate finance, it is not limited to it. Green finance also encompasses a broader range of environmental objectives, such as controlling industrial pollution, ensuring water sanitation, and protecting biodiversity. Specifically related to climate change activities,

mitigation finance pertains to investments in projects and programs that contribute to the reduction or avoidance of greenhouse gas (GHG) emissions. On the other hand, adaptation finance refers to investments that help mitigate the vulnerability of goods and individuals to the impacts of climate change (Berrou, Dessertine, and Migliorelli, 2019).

For the banking sector, green finance is characterized as financial products and services that take into account environmental factors during the lending decision-making process, post-lending monitoring, and risk management procedures. These offerings are designed to encourage environmentally responsible investments and support the development of low-carbon technologies, projects, industries, and businesses (Shinde, 2023).

Green finance has numerous advantages, including, the promotion of environmentally friendly technologies and the development of environmentally friendly infrastructures; an increased value for companies through their participation in green finance, attracting more environmentally conscious investors and customers; and an improved economic outlook, as governments that promote green finance help to protect their societies from resource scarcity. They do so by building and fostering local renewable energy markets, as well as entering new markets with high employment potential (Gilchrist, Yu and Zhong, 2021).

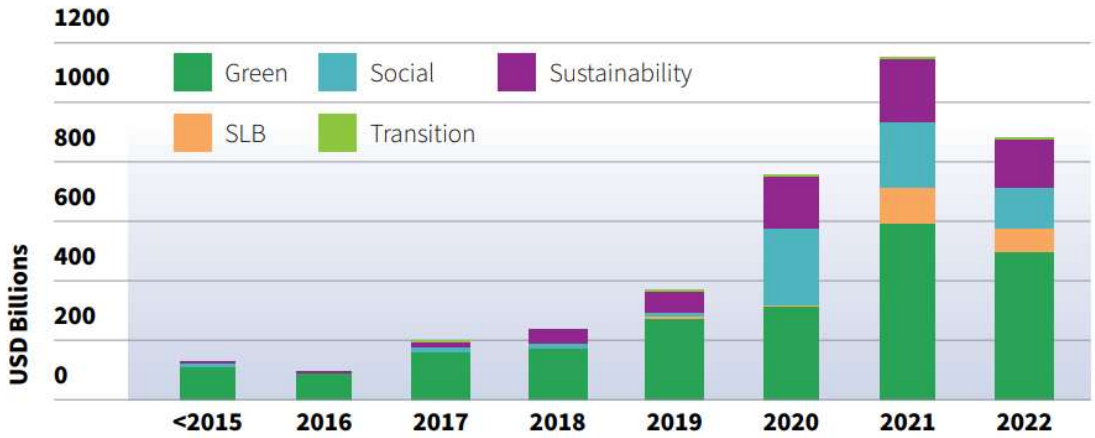
Understanding the concept of green finance has significantly increased its significance within the banking sector. Both commercial and investment banks are now actively responding to this importance. Their actions involve incorporating environmental factors into the overall strategy and governance of the banks. Additionally, they are mobilizing capital for specific green assets through activities like originating loans, providing credit and savings products, and participating in capital markets activities, such as issuing green bonds. This progress is being propelled by various global initiatives, including the Principles for Responsible Banking and the Sustainable Banking Network (Shinde, 2023).

The field of green financing is witnessing rapid growth, with a diverse range of financial instruments being employed by issuers and investors. These instruments encompass green bonds, green loans, sustainable bonds, sustainability-linked bonds, sustainability-linked loans, blue bonds, and social bonds. While social bonds may not directly contribute to green financing, there are instances where they can have an indirect positive impact on the environment. For instance, they can support investments in sustainable food systems or be utilized alongside green transformation projects, such as social bonds for a just transition. Among these instruments, green bonds represent the majority of green funding. They involve investments in bonds, and the generated earnings are utilized to support various green initiatives, including renewable energy, clean transportation, conservation, and more (European Parliament, 2021).

According to the Climate Bonds Initiative (CBI), there has been significant growth in the green bond market between 2015 and 2022, as depicted in Figure 1. On the other

hand, the social and sustainable bond market is not as well-established as the green bond market and was initiated in response to the financial crisis. As of December 31, 2022, Climate Bonds had registered a total of USD 3.7 trillion in green, social, and sustainability (GSS) debt instruments. In 2022, new issuances of these instruments amounted to USD 858.5 billion, marking a 24% decrease compared to the previous year's total of USD 1.1 trillion. Green-themed instruments continued to dominate, comprising 58% of the overall total, with a volume of USD 487.1 billion (CBI, 2022).

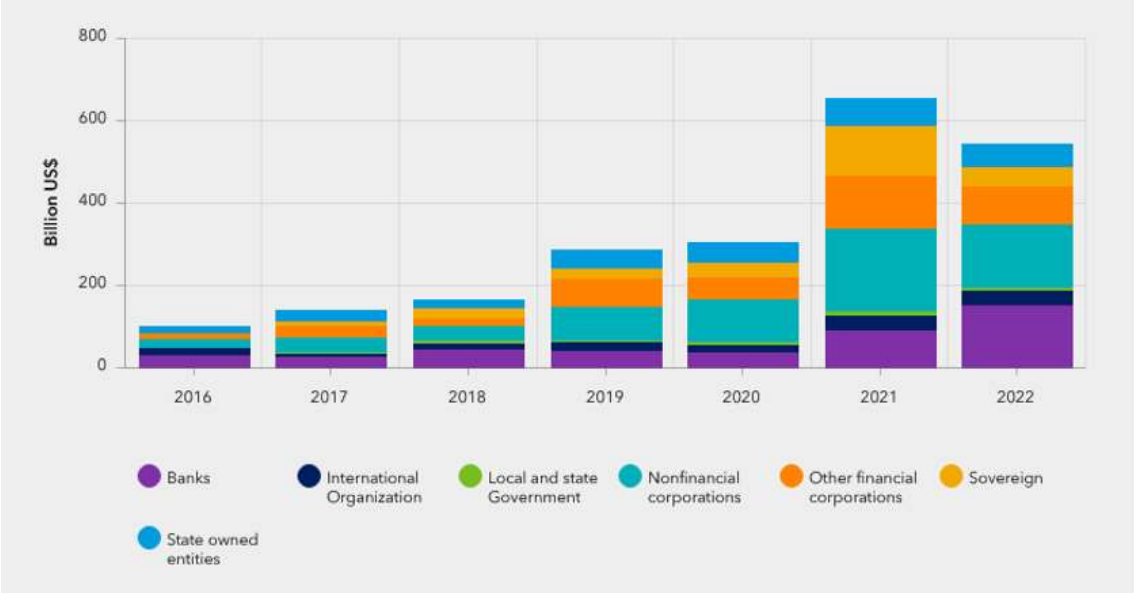
Figure 1: Labelled bond market development



Source: Climate Bond Initiative (2022)

Figure 2 shows the green bond issuance by type of issuer from 2016 to 2022. The main issuers of green bonds that have been increasing the most in this period are banks and non-financial corporations.

Figure 2. Green bond issuances by type of issuer



Source: Refinitiv; Country authorities; IMF stall calculations

In the forthcoming years, the green bond market is poised for further growth, fueled by the increasing popularity of investment strategies centered around environmental, social, and governance (ESG) considerations. To facilitate private investment in sustainable activities and promote transparency and investor protection, the European Commission has devised an action plan for financing sustainable growth. As a result of this initiative, the EU harmonized taxonomy was established in 2019, offering a comprehensive framework for identifying environmentally sustainable activities (Doronzo, Siracusa, and Antonelli, 2021).

However, limited research exists on the impact of green bond issuances on the environmental performance and engagement of issuers, mainly due to data constraints. Detailed information regarding investment projects and their environmental effects is crucial in determining the actual outcomes associated with green bond issuances. Further research is required to comprehend the implications of green bonds, as the expansion of the green finance market will provide more financial data for analysis (Fatica and Panzica, 2021).

Our study aims to address the research gap by examining the progress of green finance through the participation of major European banks in green bond issuances. The study focuses on a sample of prominent European banks, including Banco Bilbao Vizcaya Argentaria SA, Internationale Nederlanden Groep (ING), Kreditanstalt für Wiederaufbau (KfW) bank, and Natwest Group. This selection is based on two key factors. Firstly, green bonds were initially introduced by the European Investment Bank in 2007, making European banks particularly relevant for analysis. Secondly, we have chosen the leading banks from the top five European countries in terms of green bond issuances.

Our study makes at least two additional contributions to the existing literature. Firstly, we analyze and compare the issuance of green bonds by major European banks, aiming to comprehend the significance of these banks in the green bond market, utilizing available real-world data. Moreover, we specifically determine the environmental impact of assets allocated to green bonds within each financial institution. Secondly, our study holds relevance in terms of its contribution to three Sustainable Development Goals (SDGs): SDG 7 - Affordable and Clean Energy, SDG 11 - Sustainable Cities and Communities, and SDG 13 - Climate Action. By examining the implications of green bonds, our research addresses and supports progress towards these specific SDG targets.

The rest of the paper is organized as follows. In section 2, the methodology is described. Section 3 details the sample involved in the research. Section 4 points out the results and findings obtained. By last, Section 5 finishes explaining the conclusions reached.

2.Methodology

The methodology used in the paper is that of discourse analysis. Discourse analysis is a research method for studying written language in relation to its social context. First, we consolidate some ideas from previous studies in the literature and identify a clear definition of the circular economy, its relevance and superiority over the linear economy. In addition, we conduct a literature review on the green bond market. Then, we highlight some benefits of the circular economy for banks. We then select the variable to be studied, which will be green bonds, and identify the financial institutions to be analysed, bearing in mind that the sample must be representative and diverse in order to obtain more solid results.

Subsequently, we analyse the data in order to consider the implications that these financial institutions have had on green bond issuance and the sectors they have reached. Finally, we make a comparison of the whole sample and our results show the rank of financial institutions most involved in the circular economy in terms of green bond issuance.

3. Sample

Our sample include the following european banks: Banco Bilbao Vizcaya Argentaria SA, Internationale Nederlanden Groep (ING), Kreditanstalt für Wiederaufbau (KfW), and Natwest Group. Data are collected in the period 2019 to 2022, and are extracted from Climate Bond Initiative databases, and annual reports of the various financial institutions compiled via their websites.

4.Results

Table 1 displays the total amount of green bonds identified by assets allocated to green emissions in years 2019, 2020 and 2021. Data for the year 2022 were not available. Assets are mainly classified into two main groups, energy efficiency and renewable energy, including wind and solar. BBVA has also added water and waste management and sustainable transport. In 2019, the bank that allocates the most green bonds is KfW in the green sector of energy efficiency, particularly in green buildings. The same happens in the following years 2020 and 2021, same bank and same sector with higher green bonds assigned. We did not obtain detailed information on these items from BNP paribas financial institution.

Table 1: Green portfolio (millions of euros)

Category	2019	2020	2021
BBVA SA			
Energy efficiency (green buildings)	468.00 €	851.00 €	1,534.00 €
Renewable Energy (wind, solar)	1,422.00 €	1,611.00 €	2,237.00 €
Water management	79.00 €	107.00 €	168.00 €
Waste management	184.00 €	405.00 €	277.00 €
Sustainable transport	630.00 €	1,035.00 €	937.00 €
ING			
Energy efficiency (green buildings)	3,280.75 €	4,360.88 €	8,069.00 €
Renewable Energy (wind, solar)	4,942.83 €	4,151.14 €	4,968.00 €
KfW bank			
Energy efficiency (green buildings)	8,643.70 €	10,754.07 €	13,780.20 €
Renewable Energy (wind, solar)	2,256.30 €	287.93 €	2,431.80 €

Source: banks' websites

In the case of NatWest Group, the most recent available data found were in the years 2021 and 2022, as shown in table 2. In both years, energy efficiency is the green sector where most green bonds have been allocated. Specifically, NatWest Group is supporting its residential mortgage clients to improve the energy efficiency of their residential properties.

Table 2: NatWest Group´s Green Bond portfolio (millions of pounds)

Category	2021	2022
Energy Efficiency (green buildings)	**570.00£**	**708.00£**
Renewable Energy	**549.00£**	**504.00£**
Solar	220.00£	198.00£
Onshore Wind	172.00£	127.00£
Offshore Wind	137.00£	160.00£
Hydropower	20.00£	19.00£

Source: bank's website

Table 3 exhibits the green bond environmental effects of the assets committed, separating the volume of green bonds in euros and the measured impact of tonnes of CO_2 and milivatio-hour (MWh) avoided. The methodology used by the issuers to calculate the emissions avoided is based on internationally renowned standards and guidelines, ensuring that results are certified, reliable and verifiable. Specifically, the methodology is based on the generation of equivalent and comparable scenarios following the baseline scenarios proposed in standard ISO-14.062, and specifically on section 2: "Greenhouse Gases. Specification with guidance at the project level for quantification and reporting of greenhouse gas emission reductions and removal enhancements" (CBI, 2022).

Table 3: Environmental impacts of assets allocated to the green bonds

Category	Total (euros/pounds)	Impact (tons of CO_2 /MWh) avoided	Measure
BBVA (2021)			
Renewable energy			
Wind	1,054,657,590.00 €	1,164,842.00	tons
Wind (under development)	84,908,005.00 €	61,197.00	tons
Solar	369,881,238.00 €	50,065.00	tons
Others (1)	99,810,040.00 €	106,230.00	tons
Sustainable transport			
Sustainable transport	730,267,894.00 €	36,249.00	tons
Sustainable transport (under development)	53,887,620.00 €	1,971.00	tons
Energy efficiency			
Sustainable buildings	323,762,554.00 €	1,217.00	tons
Efficient lighting	14,367,801.00 €	1,338.00	tons
Waste and water management			
Water management	61,034,771.00 €		
Waste management	153,997,581.00 €		
Other			
Capture and storage CO_2	88,511,241.00 €		
Infraestructure electric vehicles	345,530.00 €		
(1)Two projects whose proceeds were used to finance in wind, solar, biomass and Mini-hydro			
KfW bank (2021)			
Energy efficient	13,780,200.00 €	216,465	tons
Renewable electricity generation	1,459,080.00 €	3,338,788	MWh
Renewable energy capacity	972,720.00 €	1,998.68	MWh
NatWest Group (2021)			
Renewable Technology	549,000,000.00 £	847.33	Mwh

Source: banks' websites

To sum up, the sectors showing higher growth were energy efficiency and renewable energy. There has been a strong increase in green bond issuance, especially in 2021, with a focus on the energy efficiency sector. However, the renewable energy projects deliver a significantly higher impact than energy-efficient housing projects. In addition, all financial institutions performed a robust and transparent selection of assets, in line with the level of sustainability that is targeted to reach a circular economy. The contributions to SDGs are: 7. Affordable & Clean Energy, 11. Sustainable Cities and Communities, and 13. Climate Action. Besides, the banks in the sample are known to be regular issuers in the green bond market, diversifying into other markets around the world. Large benchmark maturity sizes make green bonds, especially KfW's, among the most liquid green bonds in the market.

5.Conclusions

The immense damage to the environment suffered by the planet over the last few years have created an immediate necessity to reverse this reality. In this regard, the economic sector is obviously one of the protagonists of this change. Interest in green and sustainable finance is growing rapidly among international investors.

The implementation of projects to mitigate the environmental impact of our actions and contribute to curbing the effect of climate change requires a significant amount of funds. Therefore, these transformative trends in the economy and society are driving financial institutions to innovate in sustainable financial products, such as green loans and green bonds. Green bonds, for example, provide all market players with a number of advantages and act as a bridge between their different needs. Such a debt instrument enables the investor to empirically intervene in the economic transition, providing a number of psychological advantages linked to the morality and ethics of the individual, while not neglecting the profit aspect. They are also an excellent tool for portfolio diversification thanks to the high level of transparency of information about them. Green bonds are mostly focused on sustainability, mainly renewable energies, and the circular economy.

Our research analyse the development of the green finance through the involvement of major European banks in the issuance of green bonds. The study sample focuses on the European banks, such as Banco Bilbao Vizcaya Argentaria SA, BNP Paribas, Internationale Nederlanden Groep (ING), Kreditanstalt für Wiederaufbau (KfW) bank, and NatWest Group. The period sample has been from 2019 to 2022. We have compared the results obtained in the bank sample in the areas of green bonds issued, green portfolios according the green sectors identified, highlighting energy efficiency and renewable energy. Furthermore, we have made a comparison of the environmental impact of assets allocated and the geographical distribution of green bonds.

The financial institutions analyzed in our study have played a significant role in the issuance of green bonds, demonstrating an upward trend in such issuance from 2019 to 2021, aligning with the goals of achieving sustainability in a circular economy. Our findings indicate that 2021 has been a crucial year for sustainable finance globally, with a notable increase in green bond issuances and associated projects. However, in 2022, there was a decline in green bond issuance compared to the previous year, marking the first year-on-year drop in a decade, primarily due to the market turmoil experienced worldwide throughout 2022 (CBI, 2022).

Our study adds valuable insights to the existing literature regarding the advancement of green bonds. It holds significant implications for investors, as our research can assist stakeholders in making more informed decisions. Furthermore, our findings could have policy implications, as they can provide relevant information for decision-makers in promoting the continued growth of green finance.

One limitation of our study is the insufficient availability of information for all the years within our sample. In future research, it would be beneficial to expand the sample to non-European financial institutions for a more comprehensive analysis.

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