

A roadmap towards greening the European Central Bank

Author: Jordi Schröder Bosch

Published by Heinrich-Böll-Stiftung European Union, December 2023



A roadmap towards greening the European Central Bank

Author: Jordi Schröder Bosch

Published by

Heinrich-Boll-Stiftung European Union, Brussels

Rue du Luxembourg 47-51, 1050 Brussels, Belgium

Contact: Anton Möller, Head of Programme – Green Economic and Social Policy in the EU

Heinrich-Boll-Stiftung European Union, Brussels

E Anton.Moeller@eu.boell.org

Place of publication: <https://eu.boell.org>

Release date: December 2023

Layout: Micheline Gutman, Brussels

Cover illustration: isak55 | Shutterstock, All Rights Reserved.

Proofreading: Chris Meikle, Brussels

Edition: Joan Lanfranco, Head of Communications and Outreach,

Heinrich-Boll-Stiftung European Union, Brussels

License: Creative Commons, <https://creativecommons.org/licenses/by-nc-sa/4.0/>

The analysis and opinions expressed in this report reflect the views of the author,
and do not necessarily reflect the views of the Heinrich-Böll-Stiftung European Union.

ISBN 978-9-46494421-1

D/2023/11.850/3

CONTENTS

Foreword	7
Executive summary	8
Abbreviations	11
1. Introduction	12
2. The green transition and the ECB's mandate	12
2.1. Price stability	12
2.2. Financial stability	14
2.3. The secondary mandate	15
3. The ECB's policy approach thus far	16
3.1. The ECB's climate action roadmap and its risk-based foundation	16
3.2. Issues of the ECB's current monetary policy stance	18
4. Greening the ECB	19
4.1. Monetary policy operations	19
4.2. Macroprudential policies	22
4.3. Monetary policy and fiscal policy coordination	23
5. Conclusions	27
References	28

ABOUT THE AUTHOR

Jordi Schröder Bosch works as a researcher at Positive Money EU and holds an MA in International Economics from the Berlin School of Economics and Law, as well as an MA in International Macroeconomics and Financialisation from the Université Sorbonne Paris Nord.

ABOUT POSITIVE MONEY EUROPE

Positive Money Europe is a non-profit research and campaigning organisation that demands a reform of the money system so that it supports a fair, democratic and sustainable economy. To do this, they scrutinise the work of the most important monetary institution in the Eurozone, the European Central Bank. They are the bridge between this powerful institution and ordinary citizens, translating its policies into plain English, and they make proposals that ensure the money system works for everyone, and respect the limits of our planet.

FOREWORD

Central banks are crucial players in stabilising our financial system. They manage risk and ensure the smooth functioning of the economy. In the 21st century, the European Central Bank has successfully managed three major crises: the global financial crisis of 2008-2009, the euro-area sovereign debt crisis of 2010-2012, and most recently the Covid-19 crisis

The climate crisis is one of the most significant long-term risks, fundamentally threatening economic prosperity and financial stability. It is a crisis *sui generis*, stretching beyond classic economic, business and political cycles. It is, as Mark Carney, former Governor of the Bank of England, argued “the tragedy of the horizon” – “once climate change becomes a defining issue for financial stability, it may be already too late”.

Central bankers have come to recognize the systemic dangers of climate change for the financial system. Progress has particularly been made on transparency and climate disclosure. This year the ECB published its first climate-related financial disclosures, providing information on its portfolios’ carbon footprint. But more is needed. It is time to move past climate reporting and disclosures, towards risk mitigation. Now that we know the risk on the horizon, we must also act on it.

The time is ripe. A window of opportunity for more ECB climate action is emerging: ECB President Christine Lagarde stated that new measures ought to be introduced, and an ECB strategy review is taking place in 2025. Members of the ECB Governing Council, such as Frank Elderson, have already promoted the idea of Green Refinancing Operations, and French President Emmanuel Macron has called for dual interest rates at the COP28.

With this study, we want to contribute to this debate and explore how the European Central Bank can use its vast portfolios and tools to actively reduce climate risk. This study shows that climate change requires central bank intervention and that – in anticipation of climate risks – the ECB can and should double down on its pledges to green central bank activities. Against this background, the report identifies numerous concrete policy options, from enhancing green tilting approaches in asset purchasing programmes to offering favourable refinancing terms to banks engaged in green lending.

We want to thank Jordi Schröder-Bosch and the team of Positive Money EU for this comprehensive, concrete and action-oriented analysis, which demonstrates the range of policy options the ECB can take to address the great challenge of climate change.

Brussels, December 2023

Roderick Kefferpütz
Director
Heinrich-Böll-Stiftung
European Union, Brussels

Anton Möller
Head of Programme, Green Economic and Social
Policy in the EU
Heinrich-Böll-Stiftung European Union, Brussels

EXECUTIVE SUMMARY

Mitigating climate change and environmental degradation stands as one of the most pressing societal challenges for the foreseeable future. The far-reaching implications of climate change hold significant consequences for the operations of the European Central Bank (ECB). Notably, the volatile nature of fossil fuel prices, a key driver of climate change, poses a direct threat to the ECB's core mandate of achieving price stability. Furthermore, rising global temperatures, coupled with the increasing frequency and intensity of extreme weather events, contribute to inflationary pressures, which are expected to amplify as climate change intensifies. Additionally, climate change introduces systemic risks to financial stability, which will only worsen if left unaddressed. It is, therefore, entirely justified, and necessary, within the framework of its primary mandate, for the ECB to take ambitious action to mitigate climate change. Furthermore, the ECB is obligated by its secondary mandate to support the European Union's efforts to accelerate the green transition.

Since the adoption of its climate action roadmap in July 2021, the ECB has taken important steps to incorporate climate change considerations into its monetary policy operations. Most notably, the implementation of the roadmap signalled a departure from the market neutrality principle, which allowed for a substantial carbon bias in its operations. While this shift marks positive progress, the ECB's policy reforms thus far fall short of the magnitude of the climate challenge in relation to price and financial stability. This is because the ECB has adopted a risk-based approach, focussing on assessing the impacts of climate-related financial risks on the financial sector. In the context of monetary policy, this approach emphasises mitigating the influence of climate-related risks on the ECB's balance sheet.

To fulfil its legal obligations, the ECB must embrace a proactive environmental approach that goes beyond assessing climate-related risks to the financial sector and also encompasses evaluating and mitigating the impact of the financial sector's activities on the environment. In the context of monetary policy operations, this entails a shifting towards evaluating the environmental risks posed by the ECB's balance sheet. By adopting this more proactive stance, the ECB can implement climate mitigation measures aimed at accelerating the green transition. In doing so, it can maintain future price stability, bolster financial system resilience and fulfil its secondary mandate.

ECB President Christine Lagarde has stated that in 2024, the ECB will introduce new measures to further align its operations with the Paris Agreement. Additionally, the ECB is scheduled to undergo a strategy review in 2025. These upcoming milestones present valuable opportunities to advocate for the policy recommendations set out in this report and summarised below.

Monetary policy operations

1. Asset purchase programmes

- Transition to a 'stock-based approach' by actively divesting from dirty bonds in the portfolio and replacing them with green ones.
- Enhance the green tilting approach by focusing on absolute emissions, screening high-emission sectors and consider broader issuer climate profiles.
- Expand greening initiatives to encompass other private securities, such as covered bonds and asset-backed securities.

2. Collateral framework

- Introduction of environmental footprints in the calculation of haircuts.
- Exclude bonds from companies primarily engaged in non-Paris compliant activities from the collateral framework.
- Increase greening reforms scope by including covered bonds and asset-backed securities, which constitute a substantial portion of private collateral. Enhance the green tilting approach by focusing on absolute emissions, which encompass the highest share of used private collateral in the collateral framework.

3. Green-TLTRO

- Implement a green Targeted Longer-Term Refinancing Operations (g-TLTRO) programme, offering favourable refinancing terms to banks that engage in green lending.
- An initial programme, ready to be implemented, would make use of the EU Taxonomy for Sustainable Activities, which currently encompasses detailed screening criteria for two out of the six environmental objectives. This initial programme would be directed to the renewable energy sector and energy-efficient housing.
- As the European Banking Authority (EBA) introduces a definition for green loans and banks systematically start gathering data, the ECB will be able to expand the green-TLTRO programme to encompass a broader range of sectors based on the composition of banks' entire portfolios.

Macroprudential policies

This set of policies are addressed both to the ECB and national competent authorities in charge of financial supervision.

1. Capital requirements

- *Green differentiated capital requirements*, which would change assets risk weights depending on their environmental footprint.
- The application of surcharges on capital requirements when *prudential transition plans* do not meet expectations.
- *Climate-systemic risk buffers*, under which supervisors would require banks to hold capital buffers proportional to their exposure to specific sectors and/or institutions, which would reflect a particular institution's exposure to climate-related risks.

2. Borrower-based macroprudential policies: Limit the amount of potential borrowing depending on the carbon intensity of the asset and/or industry.

Monetary policy and fiscal policy coordination

A reworked monetary policy and fiscal policy coordination framework needs to:

1. Incentivise green public investment through a:

- Permanent green public bond purchasing facility.
- Preferential treatment for green public bonds within the collateral framework.

2. Close spreads:

- End overreliance on private credit rating agencies and, by so doing, move away from market discipline.
- Return to a more uniform treatment of government debt within the collateral framework in order to close spreads.

Acknowledgements: The author would like to thank Aleksandar Simić, Clarisse Murphy, Jens van 't Klooster, Uuriintuya Batsaikhan and Vicky Van Eyck for their valuable feedback. Any remaining errors or omissions are the sole responsibility of the author.

ABBREVIATIONS

APP	Asset Purchase Programme
BIS	Bank for International Settlements
CoC	Cost of Capital
CSPP	Corporate Sector Purchase Programme
CSRD	Corporate Sustainability Reporting Directive
EBA	European Banking Authority
ECB	European Central Bank
EIB	European Investment Bank
EPBD	Energy Performance of Buildings Directive
ESRB	European Systemic Risk Board
EU	European Union
FSI	Financial Stability Institute
GHG	Greenhouse Gas
g-TLTRO	green Targeted Longer-Term Refinancing Operations
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
PEPP	Pandemic Emergency Purchase Programme
SREP	Supervisory Review and Evaluation Process
SSM	Single Supervisory Mechanism
TLTRP	Targeted Longer-Term Refinancing Operations
TPI	Transmission Protection Instrument

1. Introduction

To meet its climate and energy targets under the Paris Agreement, the European Union (EU) must reduce its emissions by at least 40% by 2030 compared to 1990 levels, and achieve complete climate neutrality by 2050. Alarmingly, the Intergovernmental Panel on Climate Change (IPCC) warns that the world is on track to exceed the critical +1.5°C target within the next two decades, with dire consequences for our society.¹

In this pivotal moment, policy actions taken in the coming years will determine the type of world that we will live in. The European Central Bank (ECB), as a key European institution, should play a more prominent role in supporting the green transition. While the initial steps that the ECB has taken in that direction are welcome, they fall short of the magnitude of the task in front of us.

In its latest climate stress test, the ECB argued that delivering on the green transition as soon as possible will benefit all economic stakeholders by reducing emissions, limiting financial risks and shrinking energy expenses.² As will be demonstrated in this report, it will also be essential for the ECB to fulfil its core objectives of maintaining price stability, ensuring financial stability and aligning with the EU's broader policy goals, as required by the EU's founding treaties.

This report is dedicated to elucidating the specific changes in ECB policymaking that can pave the way for such a transformative shift. In order to do that, this report is structured in three main parts. The first part argues why the ECB is legally obligated to act on climate change. The second part illustrates the green policies implemented by the ECB thus far, as well as their shortcomings, and the drawbacks of its current approach to monetary policy. The third part presents a set of policy recommendations designed to accelerate the ECB's contributions towards the green transition and mitigating climate change.

2. The green transition and the ECB's mandate

In this part we will set out why the ECB is legally obligated, both through its primary mandate of ensuring price stability, and its secondary mandate of supporting the general economic policies of the Union, to address climate change. We will discuss how climate change poses risks to the ECB's ability to achieve price stability and financial stability, and also to its role as a financial regulator.

2.1. Price stability

The ECB's primary goal is to maintain price stability, and it does this by conducting monetary policy. The ECB operates with goal independence, which means that it defines the concept of price stability itself. Following its 2021 Strategy Review, the ECB defined price stability as achieving "two percent inflation over the medium term"³ However, today, two phenomena in particular pose significant threats to the ECB's ability to achieve its inflation target. These include inflation caused by volatile fossil fuel prices (referred to as 'fossilflation') and inflation surges attributed to the effects of climate change (known as 'climateflation'). In the following two subsections, we will delve into the challenges presented by climateflation and fossilflation to the ECB's primary mandate.

2.1.1. Climateflation

As climate change escalates, the repercussions of higher temperatures and the increased occurrence of extreme weather events⁴ on price stability are becoming evident in the form of climate-driven inflation, referred to as ‘climateflation’.⁵ Numerous studies have documented the significant impact of extreme weather events and rising temperatures on pricing dynamics in the euro area.⁶

Climateflation has a particularly pronounced impact on food prices.⁷ For instance, Kotz et al. (2023) found that the extreme heat waves during the 2022 summer season resulted in a cumulative increase of 0.34 percentage points in annual headline inflation and 0.67 percentage points in food inflation.⁸ This significant impact on food inflation directly contributes to rising inequality, as low-income households allocate a considerably higher proportion of their consumption expenditure to food compared to wealthier households.⁹ Moreover, the impact of climateflation varies across countries, with Southern European countries typically experiencing more pronounced inflationary effects.¹⁰ This divergence between euro area countries further complicates the ECB’s primary mandate of maintaining price stability across the area.

The ramifications of climateflation also extend beyond the borders of the Eurozone. Global price dynamics play a key role in determining inflation in the euro area. Swings in global food prices account for 25% to 30% of consumer price volatility¹¹ as climate-related shocks occurring outside the euro area are transmitted to the region through elevated imported prices.

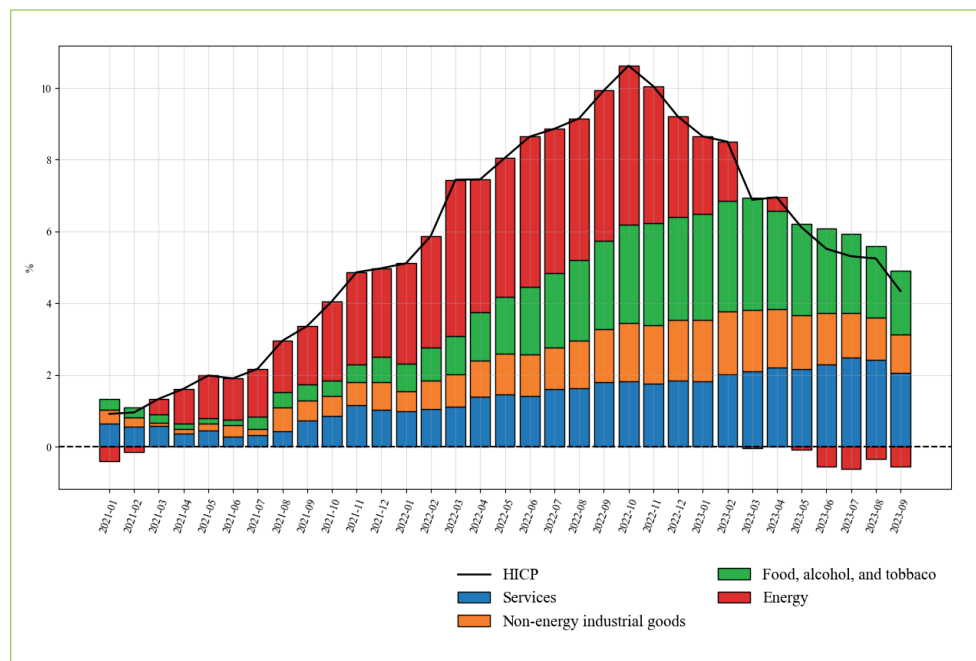
Research has also shown that the impact of extreme weather events and rising temperatures is nonlinear.¹² In other words, the impact becomes disproportionately greater with larger weather events and higher temperatures. This is a warning that, as global temperatures continue to rise and extreme weather events become more frequent, their inflationary consequences will only intensify.

As climate change intensifies, along with the impact of climateflation, the ECB’s ability to achieve price stability is increasingly at risk. Consequently, mitigating climate change is essential for maintaining long-term price stability and for the ECB to deliver on its primary mandate.

2.1.2. Fossilflation and the green transition

The green transition entails a shift away from a fossil-fuel dependent economy. As observed in the inflationary cycle that began in 2021, fossil fuel prices are extremely volatile, and this volatility passes on to the rest of goods because fossil energy is present in most production processes.¹³ According to Neri et al. (2023), the energy shock, aggravated by the Russian invasion of Ukraine, contributed to approximately 60% of the euro area’s peak inflation¹⁴, through both its direct impact on energy prices and its indirect impact on other goods. *Figure 1* shows the fossil-fuel price shock experienced in the euro area, and how it subsequently spread to the prices of other goods.

Figure 1: HICP contributions to euro area annual inflation



Source: Eurostat. Own elaboration.

Conversely, a rapid transition to green energy sources supports price stability, as the ECB itself has acknowledged.¹⁵ During the 2010s, the price of electricity from renewable sources experienced a sustained decline, rendering them more cost competitive than fossil fuel sources.¹⁶ This downward trajectory was temporarily disrupted by the impact of increased material costs resulting from Covid-19-induced supply bottlenecks and higher interest rates. However, according to the International Energy Agency, solar PV and onshore wind continue to represent the most cost-effective options for electricity generation, and their prices have once again begun to decline.¹⁷ Furthermore, renewable electricity prices are not only more competitive but also exhibit greater stability compared to their fossil fuel counterparts.¹⁸ Unlike fossil fuel energy generation sources, which rely on a continuous supply of fossil fuels once built, renewable sources generate electricity without the need for ongoing resource inputs.

Hence, transitioning from a fossil fuel-based economy, prone to intermittent inflation spikes due to fossil fuel price volatility, to a green economy powered by renewable energies with stable and declining prices, would facilitate the ECB's task of maintaining price stability and delivering on its primary mandate.

2.2. Financial stability

The Global Financial Crisis was a stark reminder for central bankers about the importance of financial stability.¹⁹ Today, financial stability concerns the ECB both in its role as monetary authority and its role as financial supervisor. Within its monetary policy operations, financial stability is considered a prerequisite for the ECB's goal of price stability.²⁰ It serves as an intermediary goal, without which the ECB cannot fulfil its primary mandate.

The ECB's role as a financial supervisor has expanded over time. Since 2014, under the Single Supervisory Mechanism (SSM), the ECB has assumed the responsibility of supervising and maintaining the financial stability of systemically important institutions,²¹ a task previously held by national competent authorities. Additionally, the ECB plays a pivotal institutional role within the European Systemic Risk Board (ESRB), which is responsible for monitoring and analysing financial risks in the EU.

Climate change poses great challenges to financial stability through its influence on physical, liability and transition risks.²² Physical risks relate to the influence of climate and weather events on the value of financial assets and insurance liabilities. Liability risks emerge when parties affected by climate change seek compensation from responsible entities through environmental litigation.²³ Finally, transition risks stem from the effects of the green transition, driven by policy changes and technological innovations, leading to a re-evaluation of financial asset values.

The acceleration of climate change, by intensifying these types of financial risks, poses a direct threat to the ECB's mandate, impacting both its monetary policy and financial supervision functions. According to the ECB, the results of its second economy-wide climate stress test, which assessed the impact of various transition scenarios on banks, households and non-financial companies, indicate that an accelerated green transition would limit future financial instability, compared to delayed or late-push transition scenarios.²⁴

There are two ways in which the ECB can approach climate-related financial stability policy-making: through a risk-based approach or through a proactive environmental approach.²⁵ The risk-based approach primarily focuses on assessing the implications of climate-related financial risks on the stability of the financial sector. In contrast, the proactive environmental approach takes a broader perspective, evaluating not only the climate-related risks to the financial sector but also assessing the impact of the financial sector's practices on the environment.²⁶ The latter approach, also known as the double materiality approach, acknowledges the complex interplay between climate change's impact on the financial sector and vice versa.

The ECB currently follows the risk-based approach, which, as will be elaborated in this report, offers limited room for adopting ambitious measures to address climate change. Conversely, by adopting a more proactive stance, the ECB could implement climate mitigation measures aimed at accelerating the transition. According to the findings of the ECB's own climate stress tests, this action would bolster financial stability, aligning it with the ECB's primary mandate of achieving price stability.²⁷

2.3. The secondary mandate

The ECB is legally obligated, under Article 127 (5) of the Treaty on the Functioning of the European Union,²⁸ to 'support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union' without compromising its primary goal of price stability. The objectives set out in Article 3 include the pursuit of a high level of protection and improvement of the quality of the environmental, among other objectives such as full employment and social progress, a highly competitive social market economy, and economic growth and price stability.²⁹

Article 127 (3) makes it clear that the ECB should not support the Union's economic policies if it would mean compromising its primary goal of price stability. However, as has been argued in the previous sections, climate change mitigation would strengthen, not threaten, price stability.

As for the prioritisation between the different objectives set out in Article 3, improved democratic processes can help the ECB to make a balancing exercise between competing policy objectives.³⁰ In fact, the latest ECB Annual Report improved this process by suggesting the Annual Report itself as a means for the European Parliament to offer input on the ECB's secondary objectives, and

for the ECB to explain its interpretation and actions regarding these objectives.³¹ In this regard, it is important to bear in mind that by ratifying the Paris Treaty, the EU and its institutions, which include the ECB and EU legislatures (European Commission, European Parliament and Council of the EU) are legally bound to the climate and energy targets set out in that Agreement.

The three subsections above demonstrate that the ECB has solid legal foundations to act on climate change. Both price stability and financial stability, which are jeopardised by climate change, are necessary to fulfil its primary mandate. Moreover, since climate mitigation does not compromise price stability, but in fact strengthens it, the ECB is legally bound to support the EU general policies, with the green transition bei

3. The ECB's policy approach thus far

This part is divided into two sections. In the first section, the actions that the ECB has taken thus far under its climate action roadmap will be discussed, as well as the limitations of its risk-based approach in effectively mitigating climate change. In the second section, we will explain the negative impact of the ECB's current approach to monetary policy on the investments needed for the green transition.

3.1. The ECB's climate action roadmap and its risk-based foundation

In July 2021, following the completion of its monetary policy strategy review, the ECB unveiled its climate action roadmap, which aimed to incorporate climate change considerations into the ECB's monetary policy strategy.³² The plan's implementation was further outlined in July 2022.³³ The two most significant changes pertain to the greening of the ECB's collateral framework and its asset purchase programme.

The publication of the climate action roadmap was significant, in that it appeared amidst a cascade of critique regarding the evident carbon bias in the ECB's monetary policy operations. This carbon bias emerged as a consequence of the ECB following the principle of market neutrality when carrying out its monetary policy operations,³⁴ which consisted in not treating with preference any financial asset, issuer or sector,³⁵ and hence accepting the prevailing outcomes in the financial markets. The adherence to this principle reinforced the status quo in financial markets, where carbon-intensive companies were over-represented. Researchers demonstrated this carbon bias in both the ECB's Corporate Sector Purchase Programme (CSPP) and its collateral framework by revealing an over-representation of carbon-intensive sectors in both programmes compared to their actual share in the real economy, measured by factors such as employment or value added.³⁶

The ECB's adoption of the climate action roadmap effectively demonstrated its willingness to shift away from the market neutrality principle, signalling its commitment to address climate concerns. Nevertheless, in its implementation of the roadmap, it decided to adopt a risk-based approach. In the context of its monetary policy operations, this approach restricts the ECB to assessing the influence of climate-related risks on its balance sheet without considering the impact of its balance sheet on the environment. The limitations of this approach in fulfilling the bold climate action required to meet its primary mandate of ensuring price stability will be demonstrated further below.

3.1.1. The ECB's approach to greening its corporate bond purchases

Asset purchase programmes consist in the purchase of different types of low-risk financial assets by central banks, aiming to stabilise financial markets and stimulate lending. Currently, the ECB holds financial assets in two of its ongoing programmes: the Asset Purchase Programme (APP) and the Pandemic Emergency Purchase Programme (PEPP). Most of the ECB's corporate securities are held under the Corporate Sector Purchase Programme (CSPP), a subset of the larger APP, with a smaller portion in the PEPP corporate holdings.³⁷ As of November 2023, the ECB's holdings of corporate bonds amounts to €380 billion, which underscores the importance of reforming these programmes.

Under the climate-action roadmap, the ECB announced a shift in its corporate bond purchases, prioritising issuers with superior climate performance. This assessment was based on the issuer's emission intensity, the quality of their climate disclosures, and the ambitiousness of their carbon reduction goals.³⁸ Emission intensity was evaluated using a 'best-in-class' approach, comparing issuers within the same sector, and a 'best-in-universe' approach, comparing issuers across all sectors. Based on final climate scores, the ECB tilted its purchases towards better performers, limited maturities for worse performers, and gave preferential treatment to better performers and issuers that fulfil stringent criteria when bidding in the primary markets.³⁹

Efforts to green its corporate holdings led to a 65% reduction in the weighted average carbon intensity of purchases in Q4 2022.⁴⁰ However, the slow pace of reinvestments, relative to the size of the CSPP portfolio, limited its overall impact. Total emissions in the CSPP for 2022 stood at 60 million metric tons of CO₂ equivalent, equivalent to 13,351,817 gasoline-powered vehicles driven for a year.

The tilting process came to a premature end in July 2023, when the Governing Council decided to stop reinvestments in its APP programme, as the ECB changed its monetary policy stance due to rising prices.⁴¹ From now on, the CSPP portfolio will be wound down through monthly redemptions — the amount of bonds maturing each month. The total stock of holdings within the CSPP is huge compared to the monthly flow of redemptions, which comes in dribs and drabs. Therefore, it will take a long time until the total portfolio of the CSPP completely unwinds⁴². Under its current strategy, the ECB would still hold a substantial share of carbon-intensive bonds in 2030.⁴³ As we will discuss in Section 4, there are more effective ways for the ECB to further green its corporate sector holdings.

3.1.2. The ECB's approach to greening the collateral framework

The collateral framework establishes the rules governing the ECB's credit operations with banks, which are designed to prevent losses within the ECB's balance sheet.⁴⁴ Risks are mitigated through criteria related to counterparty eligibility, collateral eligibility, the setting of haircuts — the difference between the value of the collateral pledged by the bank and the value of the ECB's loan — and daily collateral valuation.

The collateral framework plays a pivotal role in financial markets, as it sets a benchmark for private financial actors⁴⁵. What bonds are eligible in the collateral framework, and the haircut applied to them, will be reflected in the funding conditions of the issuing company.⁴⁶ Moreover, it is important to note that, contrary to temporary policies like asset purchase programmes, the collateral framework is always operative, as it is part of conventional monetary policymaking. This means that its broader impacts are long-standing.

In its climate-action roadmap, the ECB decided to 'green' its collateral framework by reevaluating both its eligibility criteria and its haircut framework. The eligibility criteria determine whether a financial asset is considered suitable for use as collateral in the ECB's refinancing operations. The haircut framework manages the difference between the value of the financial asset that a bank pledges as collateral and the money that the ECB lends to the bank. As an illustration, within the existing haircut framework⁴⁷, a bank using a corporate bond of the highest credit quality and 10-year

maturity as collateral would receive a loan from the ECB equivalent to 91.5% of the bond's value. In other words, the ECB would only apply an 8.5% haircut to that bond. The haircut is therefore a powerful tool to discourage certain types of collateral.

In both cases, the ECB decided to follow a risk-based approach. As explained in Section 2.2, this approach aims to safeguard the ECB's balance sheet from climate-related risks, and therefore offers little consideration for the collateral framework's impact on the environment. This significantly limits its potential effects on broader climate mitigation and, consequently, financial stability goals. For example, based on this approach, the ECB opted not to make any changes to haircuts, stating that the "updated haircut schedule is already sufficiently protective against climate-related financial risks"⁴⁸, and this despite the abovementioned critiques about the carbon bias inherent in the collateral framework. ECB researchers simply categorised non-financial corporations into two groups: high-emitting and low-emitting and found that the difference in financial losses between these groups in the event of an adverse financial scenario was not significant. The same authors argued that climate change transition risks are unlikely to materialise over this short time horizon.⁴⁹

This policy conclusion would not have followed if a proactive environmental approach had been adopted. In that case, the environmental impact of holding these high-emitting company bonds on the ECB's balance sheet would have had to be assessed with the most probable conclusion being a decision to raise haircuts for these bonds, and even excluding the worst emitters. Such an approach would enable the ECB to actively address climate change, thereby exerting a meaningful influence on long-term financial stability. Future revisions of the ECB's haircut framework present an opportunity to implement a proactive environmental approach, as recommended in Section 4.1.2.

Besides adjusting haircuts to reflect climate-related risks, the ECB also stated that it would limit the share of assets from high carbon issuers that are eligible as collateral for obtaining financing from the ECB. While specific details are yet to be clarified, the ECB plans to impose collateral pool limits based on greenhouse emissions to reduce concentration risks.⁵⁰ Consequently, banks with a high share of bonds from issuers with a high carbon footprint will face limitations in accessing ECB financing. Implementation is scheduled for late 2024. This represents an excellent opportunity for the ECB to apply a proactive environmental approach to its eligibility criteria, aligning eligible collateral with the Paris Agreement, which is not currently the case.⁵¹ This will be further discussed in Section 4.1.2.

Finally, the ECB will also limit eligibility to issuers complying with asset sustainability performance disclosure requirements under the Corporate Sustainability Reporting Directive (CSRD), which is expected to apply as of 2026. The disclosure of CSRD data will enable the ECB to apply a more robust proactive environmental approach.

3.2. Issues of the ECB's current monetary policy stance

As a reaction to surging inflation, the ECB started tightening its monetary policy stance by raising interest rates in July 2022. The ECB's relentless interest rate hikes since then are having an adverse impact on the green transition. This is because renewable energy projects typically require more capital than fossil fuel projects, and are therefore heavily influenced by the cost of capital (CoC).⁵² Consequently, interest rate hikes, by elevating the CoC, have a significant negative impact on clean energy projects. This in turn puts upward pressure on renewable energy costs, undermining its price competitiveness.⁵³ Underscoring this point, IRENA's report estimated that "for a representative solar photovoltaic (PV) project or onshore wind project, the total cost of electricity increases by 80% if the CoC is 10% rather than 2%".

According to Bianchi et al. (2023), the ECB's current policy measures are projected to add €163 billion in costs for green investments in the Dutch economy between 2030-2050.⁵⁴ A recent ECB survey revealed that more than half of the surveyed firms identified high financing costs as a signif-

icant obstacle to securing investments related to climate initiatives.⁵⁵ Due to this carbon bias in its current monetary policy approach, the ECB is effectively hindering the green transition⁵⁶ and this during a time when more rather than less investments in renewables are needed to prevent future fossilflation and climateflation. By prioritising short-term price stability using the blunt tool of interest rates, the ECB is increasing its exposure to climate-related financial risks and is endangering future price stability.

The irony of the current situation has reinforced support and calls for an additional policy tool that would provide preferential financing conditions for green initiatives, known as dual rates or Green TLTROs⁵⁷, which we will further discuss in Section 4.1.3. While ECB President Christine Lagarde as well as Executive Board member Isabel Schnabel have shown support for this type of targeted financing programme, they have made it clear that this will only be considered once inflation goes down again.⁵⁸

However, postponing green policies to a future when inflation is low and financial conditions have eased for all sectors limits the power of such policies. It is precisely in times when financial conditions are binding for all sectors that establishing differentiated financial conditions for green projects are a more impactful policy tool.⁵⁹ Moreover, it would not be the first time that central banks adopt a targeted approach during a tightening cycle.⁶⁰

4. Greening the ECB

This section presents a series of policy recommendations designed to steer the ECB towards more ambitious green action in its monetary policy and macroprudential policy operations, and to improve monetary and fiscal coordination. The policy changes proposed follow a proactive environmental approach, which offers a more effective means of mitigating climate change and facilitating the green transition, while ensuring that the ECB continues to deliver on its primary and secondary mandates.

4.1. Monetary policy operations

4.1.1. Asset purchase programmes

As discussed in Section 3.1.1, the green tilting approach that the ECB applied to its asset purchase programmes, including the Asset Purchase Programme (APP) and the Pandemic Emergency Purchase Programme (PEPP), under its climate action roadmap was insufficiently ambitious. The end of reinvestments in the APP signified the end of the green tilting of the CSPP. As the portfolio is slowly unwound, the ECB will continue to hold a significant proportion of carbon-intensive bonds in the years ahead.⁶¹ Instead, the ECB could effectively reduce its holdings of carbon-intensive bonds and introduce a more ambitious green tilting approach in its future asset purchase programmes.

The ECB can unwind the carbon-intensive bonds it currently holds through a ‘stock-based approach’, which consists of selling dirty bonds within the CSPP portfolio and purchasing green ones.⁶² This would not alter the ECB’s current monetary policy stance of winding down its balance sheet, as the total stock of financial securities that it holds would remain unchanged. This approach would allow the ECB to ramp up the pace of the transition from a dirty portfolio to a green one.

Furthermore, the ECB’s green tilting approach must be bolstered to adopt a more proactive stance toward climate change mitigation. That can be achieved through the following reforms

to the current green tilting approach. First, the ECB should not only focus on a company's emissions relative to sales, but also on a company's absolute emissions. In this way, companies that diversify towards non-polluting activities, while not abating their polluting activities, are not compensated by the framework.⁶³ Second, partly relying on a 'best-in-class' approach, as discussed in Section 3.1.1., can lead to a situation where the ECB is buying the bonds of high-emitting issuers just because they have better performance than their sector-related peers, allowing it to continue purchasing bonds tied to fossil fuel companies.⁶⁴ This leads to a concentration of carbon intensity within the ECB portfolio in very few sectors,⁶⁵ such as construction and materials, chemicals, and utilities. The ECB should exclude from its asset purchase programme companies whose economic activities are not aligned with the Paris Agreement, like oil producers.⁶⁶ Third, any favourable treatment of green bonds must consider the issuer's climate profile, referring to the activities the company engages in, to prevent greenwashing; otherwise, the ECB could end up purchasing green bonds from carbon-intensive companies.

Lastly, the ECB should pursue the greening of other private securities in its monetary portfolio. As of July 2022, corporate bonds constitute slightly above half of the private securities held within the ECB's purchase programmes. The remaining private securities are held under the covered bonds and asset-backed securities programmes. Since these financial instruments are created by packaging multiple loans, usually mortgages, improvements in data availability are required to ensure that the ECB can also green these programmes. Data collection under the recast of the Energy Performance of Buildings Directive (EPBD) will therefore become very important for this endeavour.

As asset purchase programmes have become an integral component of the ECB's policy mix, explicit guidelines are crucial for greening both current and future portfolios.

4.1.2. The collateral framework

As discussed in Section 3.1.2, the risk-based approach advocated by the ECB to green its collateral framework has significant shortcomings that result in inaction. In this section, we present a proactive environmental approach to greening the framework, which should encompass the elements outlined below.

Defining greenness: Picking the set of variables through which we assess greenness is not an easy task. Solely focusing on emissions is flawed, and, contrary to some proposals,⁶⁷ the EU Taxonomy for Sustainable Activities is not fit for the purpose, as it does not define dirty activities. Greenness needs to be defined by a set of backward- and forward-looking variables, including absolute Greenhouse Gas (GHG) emissions, transition plans,⁶⁸ absolute emission reductions, environmental expenditures and fossil fuel investments.

The level at which greenness is defined is key. Assessment at the sectoral level would undermine efforts made by particular companies to lower their carbon intensity. Definition at the asset level can lead to greenwashing. Hence, definition should be done at the issuer level, complemented, when data availability makes it possible, with asset-level assessment.⁶⁹

Setting haircuts: Haircuts should be set through a sliding-scale approach, in which the sectoral haircut grows (or decreases) depending on the environmental footprint of the firm.^{70,71} This complementary approach would allow policymakers to penalise the most carbon-intensive sectors, while, at the same time, rewarding the best climate performers and companies with more robust transition plans within the sector.

Eligibility screening: Negative screening has a stronger impact on funding costs than changes in haircuts,⁷² as non-eligibility is commensurate with a 100% haircut. Therefore, exclusion should be used to screen issuers whose main economic activity is non-compliant with the Paris Agreement, such as oil and gas developers. Negative screening should be operationalized in a gradual approach, and complemented with positive screening, so as to keep the volume of eligible assets unchanged.

Scope expansion: Current reforms under the climate action roadmap have been directed towards corporate bonds. Yet, these involve only 10.7% of the eligible collateral under the ECB's collateral framework and 2.8% of all used collateral in April to June 2023.⁷³ Reform efforts should encompass other financial securities, especially covered bonds and asset-backed securities, which constitute 13.1% of the total eligible collateral and 41.8% of used collateral. Quantifying their environmental impact poses great challenges, as these financial securities are composed of an enormous pool of assets. To do this, data collection needs to be improved. Fortunately, the European Banking Authority (EBA) and the ECB are making steps towards climate change disclosure on securitised assets.⁷⁴

Government securities, which make up the largest share of eligible assets within the collateral framework, warrant a separate discussion in Section 4.3 due to their distinct nature compared to private assets.

The changes outlined above must be implemented to ensure that the ECB's collateral framework aligns with the Paris Agreement. Designing a collateral framework with the goal of mitigating climate change will ensure that the ECB is acting in line with its primary and secondary mandate (as discussed in Section 2).

4.1.3. Targeted longer-term refinancing operations

In June 2014, the ECB initiated its first Targeted Longer-Term Refinancing Operations (TLTROs) programme to encourage bank lending to the real economy during a time of inflation below target. These operations provided banks with long-term loans at favourable interest rates, compared to the ECB's standard credit operations, and therefore increased banks' profitability. These loans were contingent on commercial banks extending credit to non-financial corporations and households, excluding house purchases. TLTROs increased the volume of lending by improving the terms on which non-financial corporations and households borrow.⁷⁵ However, a recent study found a carbon bias in the third TLTRO programme (TLTRO III), which had led to increased lending to higher-than-average emitting sectors.⁷⁶

To help mitigate climate change and facilitate the green transition, the ECB could adapt the TLTRO programme to provide long-term loans to commercial banks at favourable rates when these banks' lending practices align with green transition objectives.⁷⁷

To categorise greenness, the ECB should use the EU Taxonomy for Sustainable Activities, that currently encompasses detailed screening criteria for two out of the six environmental objectives. Therefore, the ECB could initiate a green TLTRO targeting the renewable energy sector and energy-efficient renovations.⁷⁸ As the EBA introduces a definition for green loans and banks systematically start gathering data on metrics such as green asset ratios and the alignment of their banking book with the EU Taxonomy for Sustainable Activities, the ECB will have the opportunity to expand its green TLTRO to encompass a broader range of sectors based on the composition of banks' entire portfolios.

A green TLTRO programme would enhance lending conditions for strategic green sectors, such as clean energy projects and house retrofitting,⁷⁹ which strongly rely on bank lending. In previous TLTRO programmes, the rate was set as low as the deposit facility rate, which is the rate at which banks receive interest on their deposits at the ECB. However, a green TLTRO should aim for an even lower rate, in comparison to the ECB conventional lending facilities. Such a dual rate approach would ensure that strategic green sectors receive substantial differential lending conditions compared to the rest of the sectors.

As mentioned in Section 3.2, ECB President Christine Lagarde initially spoke out in favour of green TLTROs. However, this idea was abandoned when prices started to surge, with the argument that it should only be considered once the inflation target was achieved.⁸⁰ This highlights the

short-sighted aspect of the ECB's approach to price stability. Nevertheless, it's crucial to emphasise that a green TLTRO is not incompatible with the current tightening stance of the ECB. It's important that the ECB continues to stimulate lending towards sectors that are vital for the green transition, by adopting a dual rate approach in times of rising rates for the rest of the economy, precisely because they play a critical role in ensuring future price stability and financial stability, as discussed in Section 2.

4.2. Macroprudential policies

Macroprudential policies have gained prominence since the Global Financial Crisis. Unlike microprudential policies that focus on the financial soundness of individual institutions, macroprudential policies address systemic risks that can impact the entire financial system. Hence, they are vital for the financial supervisory role that the ECB assumes within the Single Supervisory Mechanism and the European Systemic Risk Board, as discussed in Section 2.2.

Climate change represents a significant systemic risk that will escalate further if left unchecked.⁸¹ Currently, financial institutions do not adequately address financial risks related to climate change. According to a joint report by the ECB and the ESRB: *'no meaningful reduction in emission intensity in the loan portfolios of euro area banks has taken place in recent years.'*⁸² Moreover, these exposures are concentrated in a few banks and sectors.

The EU's current macroprudential policy design does not tackle the above-mentioned issues. The following two subsections will therefore first explore the rationale for designing macroprudential policies from a proactive environmental perspective, and subsequently, present a set of green macroprudential policies that align with this approach.

4.2.1. Envisioning an active macroprudential policy

The ECB has taken some steps to use its regulatory powers to tackle the build-up of climate-related risks. These include setting supervisory expectations on how commercial banks should include climate and environmental risks into their operations, adopting a guiding role, and changing the commercial banks' Supervisory Review and Evaluation Process (SREP) scores. The latter affects the amount of capital banks must hold relative to the riskiness of their assets, and comes in addition to existing minimum capital requirements.⁸³ Furthermore, the ECB has started conducting economy-wide climate stress tests, which assesses the impact of various transition scenarios on banks.

Proposals for green macroprudential policies from institutions like the ECB and the ESRB (2022) or the Bank of International Settlements' Financial Stability Institute (FSI) oppose the utilisation of macroprudential policies to pursue more ambitious climate change objectives.⁸⁴ For instance, Coelho and Restoy⁸⁵ argue that an environmental approach, which could include setting capital requirements based on issuers' carbon footprints, could unintentionally increase transition systemic risks by limiting the availability and affordability of financial resources to carbon-intensive firms. However, this risk-based argument is flawed in that it fails to recognize that to mitigate future physical risks, high-polluting issuers must face transition risks. Climate financial shocks are inevitable, but it's essentially a policy choice whether those will be transition or physical shocks.⁸⁶ Paradoxically, the risk-based approach, in its effort to prevent a redirection of financial resources away from carbon-intensive activities, inadvertently increases the build-up of future physical risks.

From a proactive environmental perspective, it is essential to limit the availability of financial resources to carbon-intensive firms and redirect them towards green activities to facilitate the green transition.⁸⁷ It is precisely by supporting the green transition that the proactive approach bolsters financial stability, as an accelerated green transition represents the most secure path to financial stability.⁸⁸ The next subsection outlines a series of macroprudential policies aligned with this proactive environmental approach.

4.2.2. A green macroprudential toolbox

The proposals below apply to both the ECB and national competent authorities, as they both play a role in financial supervision in the EU.⁸⁹

Capital requirements are regulatory guidelines that determine how much capital banks need to hold relative to the riskiness of their assets. The goal of capital requirements is to create loss-absorption capacity to cover for unexpected losses that banks may incur in the future and to contain the build-up of systemic risks by steering bank credit. To the extent that climate-related financial risks are not accounted for in the current capital requirements design, banks are undercapitalised.⁹⁰ From a proactive environmental approach perspective, green capital requirements would be set to impact on banks' lending behaviour so as to limit future physical risks. Green capital requirements could be implemented through the three different approaches sketched out below.

Green differentiated capital requirements, which are set according to the environmental footprint of banks' holdings. Under this framework, assets categorised as green would see a reduction in risk weights, and assets categorised as dirty would observe an increase in risk weights, affecting the capital banks are required to hold. This would encourage banks to allocate more capital to assets with a smaller environmental footprint.

Implementing prudential transition plans can be a powerful complement to green differentiated capital requirements. Transition plans are detailed forward-looking accounts on the actions that a firm will pursue to align itself with specific environmental objectives. When a bank's plan does not meet expectations, additional capital requirements should be added.⁹¹

Finally, a climate-systemic risk buffer should be put in place, under which supervisors would require banks to hold additional capital proportional to their exposure to specific sectors and/or institutions.⁹² This measure would enhance banks' capacity to absorb losses and encourage financial institutions to divest from polluting sectors and entities. This is particularly relevant because exposure to high-carbon sectors is currently concentrated among a few banks.⁹³

Borrower-based macroprudential policies aim to influence borrowing behaviour. Examples of such policies include loan-to-value ratios and loan-to-income ratios, which limit the maximum amount that can be borrowed based on the value of the asset being financed or the borrower's income. These policies would restrict the provision of credit to carbon-intensive firms and economic activities.⁹⁴

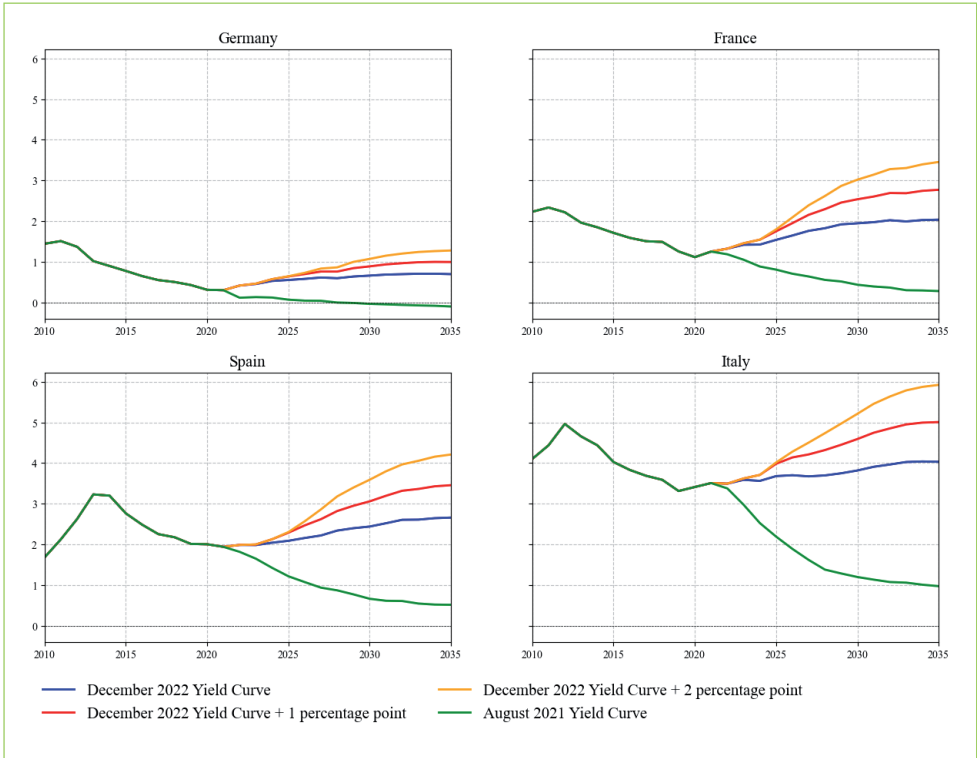
4.3. Monetary policy and fiscal policy coordination

The green transition demands a substantial increase in investment, with the European Commission estimating an annual investment need of €620 billion annually, equivalent to 3.7% of GDP in 2022.⁹⁵ According to the European Investment Bank (EIB), a significant portion, around 45%, is expected to come from public investment.⁹⁶ Fiscal policy will, therefore, have to play a pivotal role by ramping up public investment and mobilising private capital to support the green transition. However, the ECB's current tightening of monetary policy threatens to constrain the fiscal space needed for these investments by increasing the burden of interest payments of European countries.

As depicted in the graph below (*Figure 2*), a two percentage point increase over the December 2022 yield curve results in a significant rise in interest payments as a percentage of GDP by 2030.⁹⁷ For instance, Italy's debt interest payments as a percentage of GDP would surge to 5.21% by 2030, surpassing the required investment for the green transition according to the European Commission.⁹⁸ Southern European countries, like Italy, that are experiencing a higher increase in interest payments, are the very same countries that will suffer higher welfare losses from climate change,⁹⁹ and hence need to invest in climate change mitigation more urgently. These comparatively higher interest payments are primarily explained due to higher levels of public debt and higher interest rates on government debt in relation to that of Northern European countries. These government

bond spreads result in an unequal playing field for countries in the Eurozone to tackle climate change,¹⁰⁰ which is compounded by the fact that countries with high public debt are under additional pressure to cut expenditure so as not to further increase their public debt.

Figure 2: Change in interest payments caused by an increase in the yield curve



Source: Grimm et al (2023). Own elaboration.

The higher interest rate environment, along with the constraints on public debt imposed by EU fiscal rules, leaves less room for manoeuvre for governments to invest in the green transition. This is problematic, as it is an established fact that public investment gets disproportionately reduced during times of austerity.¹⁰¹

To address this, the measures outlined below seek to, on the one hand, incentivize green public spending during periods of monetary policy tightening, and, on the other hand, to reduce government bond spreads, thereby levelling the playing field for all countries in the Eurozone to fight climate change.

4.3.1. Incentivizing green public investment

Public investment in the euro area has remained exceptionally low since the Eurozone crisis.¹⁰² Furthermore, it becomes the primary scapegoat for budget cuts as governments seek to reduce their expenditures. This low level of public investment, compounded by the fact that only a quarter of it can be identified as climate related,¹⁰³ underscores the urgency of incentivizing green public investments, especially in a context where high interest payments and stringent fiscal rules are constraining public finances.

One effective way to encourage green public investment is by improving the funding conditions for green bonds, which are specifically designed to raise capital for green transition projects. While green bond issuance has gained some momentum in the Eurozone, these bonds still account for only 1.37% of the total outstanding government debt in 2022.¹⁰⁴ Furthermore, the ‘greenium’, representing the premium that green bonds offer over conventional bonds, remains negligible at 10 basis points in the EU.¹⁰⁵ This does not rise up to the magnitude of the investments needed for the green transition.

The ECB should establish a **permanent green public bond purchasing facility**, which would serve as a powerful incentive for green public investment by enhancing the green bond premium. This, in turn, would reduce the funding costs associated with green public investment. Importantly, this ECB facility should not be limited solely to national governments; it should also extend its support to municipalities and regional governments, which play a vital role in the green transition and face hard budgetary constraints, especially as interest rates increase.

In addition to assisting various government levels, the facility should consider supranational bodies. It could purchase green bonds issued by institutions such as the EIB and national development banks, as they have become pivotal players within the Eurozone fiscal landscape.¹⁰⁶ These institutions are well-positioned to finance essential large-scale trans-European projects, like European electricity grid interconnections.¹⁰⁷ Furthermore, the European Commission, which has also assumed a significant green fiscal role since 2020, should also be eligible to benefit from this facility. It is worth noting that the European Commission currently faces borrowing conditions that are less favourable than those of certain EU Member States.¹⁰⁸

The implementation of the European Green Bond Standard, which ensures alignment of funded projects with the EU Taxonomy for Sustainable Activities and external review supervision,¹⁰⁹ is a positive step towards ensuring transparency and effectiveness in green financing. This can help prevent greenwashing and ensure that funds are channelled into projects that genuinely contribute to environmental sustainability and the green transition. This is ‘an important development for promoting green finance in the EU.

Another approach to enhance the funding costs for green bonds is by implementing **preferential treatment for green public bonds within the collateral framework**. This would involve applying a reduced haircut on green public bonds, thereby making it more advantageous for financial institutions to use these bonds as collateral, which, in turn, increases the demand for these types of bonds.

Failing to support these green public investments would have detrimental consequences for public debt sustainability. Climate change adversely affects economic growth and tax revenues, as well as exposing governments to contingent liabilities¹¹⁰ (potential costs arising from catastrophes), and as such poses a significant threat to public budgets.¹¹¹ Additionally, the heavy dependence on fossil fuels entails substantial costs as well. In 2022, Eurozone governments allocated 1.9% of GDP to energy and inflation-related support measures, followed by 1.4% in 2023.¹¹² Given these challenges, incentivizing green public investment becomes imperative to ensure healthy public finances.

As these public investments are crucial for the green transition, the ECB, by improving monetary and fiscal coordination, would be acting in accordance with its secondary mandate to support the climate objectives of the EU.

4.3.2. Closing sovereign spreads

The emergence of sovereign spreads, which represent the difference between European bond yields and those of Germany, is the result of the ECB's revision of its collateral framework in 2005.¹¹³ Prior to this revision, the ECB treated government bonds as collateral equally. However, the new approach relied on assessments made by private credit rating agencies to determine eligibility and haircut rates for these bonds.¹¹⁴ The latter entails that public debt sustainability is left to the judgement of a few private credit rating agencies.

During the Eurozone crisis, we experienced the harmful consequences of this revision. Lower credit ratings resulted in higher haircuts and, in some cases, non-eligibility in the ECB's collateral framework and asset purchase programmes,¹¹⁵ creating a vicious cycle where bondholders dumped Southern economies' bonds, further constraining financing conditions for these governments. This framework effectively coordinated market expectations against weaker EU Member States,¹¹⁶ which negatively impacted these states' financing conditions.

The ECB's approach took a 180-degree turn during the Covid-19 crisis when it decided to ease its collateral rules for government bonds.¹¹⁷ This, coupled with the implementation of the PEPP, led to a narrowing of spreads. The advantageous financing conditions meant that governments could pursue the expenditures necessary to navigate through the pandemic-induced crisis. Two examples illustrate the difference in macroeconomic outcomes between the Covid-19 crisis and preceding crises.

First, as a result of the Global Financial Crisis and the subsequent Eurozone crisis, between 2008 and 2016, Greece lost around one-quarter of its GDP and never fully recovered to pre-crisis levels. In contrast, two years after the Covid-19 shock, Greece's GDP had rebounded to a level 10% above its pre-pandemic level.¹¹⁸ It is worth noting that Greece's debt-to-GDP ratio was almost double in 2020 compared to 2008. Yet, actions by the ECB meant that it had very favourable financing conditions, nonetheless.

Second, between 2008 and 2016, unemployment across the Eurozone rose by around 5%. The pre-Global Financial Crisis level of unemployment was not recovered until March 2020, the same month the Covid-19 crisis started. During the Covid-19 crisis, it took less than two years to reach the pre-crisis level of unemployment.

Both these examples illustrate the damaging effect of letting financial markets decide on outcomes in government bond markets and embrace austerity, compared to the Covid-19-crisis response.

Nevertheless, the measures implemented by the ECB during the Covid-19 response were only temporary fixes. Collateral rules are gradually being phased out, and the PEPP is set to conclude in 2024. However, the green transition necessitates that governments continue to pursue substantial public investments, and the Covid-19 response has proven that the ECB can provide countries with the fiscal space required for this effort. It is crucial for the ECB to close the spreads and create a level playing field, especially at a time when Southern European countries, facing more challenging financing conditions, are also exposed to the worst consequences of climate change.

To achieve this, the ECB should reduce its reliance on private credit rating agencies¹¹⁹ and, in doing so, shift away from market discipline. Returning to a more uniform treatment of government debt within the collateral framework could significantly impact the narrowing of spreads. Moreover, the assessment of the appropriate fiscal stance should move from market discipline to political decision-making. In cases where spreads widen during periods of turmoil, the ECB should be prepared to ease its collateral measures, similar to its actions during the Covid-19 crisis, and participate in public bond purchase programmes to ensure that spreads are brought under control. While the Transmission Protection Instrument (TPI) aligns with this direction, it has a drawback in that it follows a circular logic, as it does not fully acknowledge the ECB's role in shaping the fundamentals upon which it should base its actions.¹²⁰

5. Conclusions

Mitigating climate change and environmental degradation will be our main challenge in the decades ahead. Climate change, and the consumption of fossil fuels that propels it, exerts severe impacts on both price stability and financial stability. Therefore, the ambitious actions advocated for in this report are fully justified on the basis of the ECB's primary mandate. Furthermore, the ECB is obligated by its secondary mandate to support the EU in its efforts to accelerate the green transition.

The ECB's shift toward considering climate change in its operations, as demonstrated by its climate action roadmap, represents a positive change and a departure from its previous market neutrality principle. However, as the ECB decided to use a risk-based approach, these initial steps remain inadequate. This inadequacy is exemplified by its decision not to adjust the haircut framework in response to climate-related risks and the relatively slow pace of the green tilting of its corporate bond holdings.

In order to fulfil its legal obligations under the EU treaties, the ECB must adopt a proactive environmental stance. This entails that the ECB takes into account the broader environmental consequences of its policies. Such an approach would serve as a more fitting guiding principle, given the magnitude of the challenges that climate change entails.

ECB President Christine Lagarde has stated that in 2024 the ECB will introduce new measures to further green its operations, with the aim of aligning them with the Paris Agreement. Additionally, the ECB is set to undergo a strategy review in 2025. These upcoming milestones present valuable opportunities to advocate for the policy recommendations outlined in this report. These would align ECB policies with the green transition, and, by doing so, help maintain future price stability, bolster financial system resilience and fulfil the ECB's secondary mandate.

REFERENCES

- 1 Intergovernmental Panel on Climate Change (2022), Climate Change 2022: Impacts, Adaptation, and Vulnerability: <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>
- 2 European Central Bank (2023), The Road to Paris: stress testing the transition towards a net-zero economy: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op328~2c44ee718e.en.pdf?7793485730460e4e-0b4e170237eb7429>
- 3 European Central Bank (2023), Two per cent inflation target: <https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html>
- 4 Intergovernmental Panel on Climate Change (2023), Climate Change 2023 Synthesis Report: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf
- 5 Speech by Isabel Schnabel (2022), A new age of energy inflation: climateflation, fossilflation and greenflation: https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220317_2~dbb3582f0a.en.html
- 6 See: [Price stability and climate risks: Sensible measures for the European Central Bank](#) (Bremus et al., 2020); [Demand or supply? An empirical exploration of the effects of climate change on the macroeconomy](#) (Ciccarelli & Marotta, 2021); [The effects of natural disasters on price stability in the euro area](#) (Beirne et al., 2021).
- 7 See: [Feeling the heat: extreme temperatures and price stability](#) (Faccia et al., 2021); [The impact of global warming on inflation: averages, seasonality and extremes](#) (Kotz et al., 2023); [Climate and monetary policy: do temperature shocks lead to inflationary pressures?](#) (Mukherjee & Ouattara, 2021).
- 8 Kotz, M., Kuik, F., Lis, E., & Nickel, C. (2023), The impact of global warming on inflation: averages, seasonality and extremes: <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2821~f008e5cb9c.en.pdf>
- 9 European Central Bank (2023), The impact of the recent inflation surge across households: https://www.ecb.europa.eu/pub/economic-bulletin/articles/2023/html/ecb.ebart202303_02~037515ed7d.en.html
- 10 As shown in the studies mentioned in footnotes 6 and 7.
- 11 Peersman, G. (2022), International food commodity prices and missing (dis) inflation in the euro area: https://www.ecb.europa.eu/pub/conferences/shared/pdf/20190923_inflation_conference/S6_Peersman.pdf
- 12 See: [Feeling the heat: extreme temperatures and price stability](#) (Faccia et al., 2021); [The impact of disasters on inflation](#) (Parker, 2018).
- 13 See: [Inflation Diagnostics](#) (Lane, 2022); [How indirect effects of energy costs are adding to inflation](#) (Saunders, 2023); [Inflation in times of overlapping emergencies: systemically significant prices from an input-output perspective](#) (Weber et al., 2022).
- 14 S. Neri, F. Busetti, C. Conflitti, F. Corsello, D. Delle Monache and A. Tagliabracci, (2023), Energy price shocks and inflation in the euro area: https://www.bancaditalia.it/pubblicazioni/qef/2023-0792/QEF_792_23.pdf
- 15 European Central Bank (2023), Feedback on the input provided by the European Parliament as part of its resolution on the ECB's Annual Report 2021: https://www.ecb.europa.eu/pub/pdf/other/ecb.20230525_feedback_on_the_input_provided_by_the_european_parliament~92020517af.en.pdf
- 16 IRENA (2023), Renewable Power Generation Costs in 2022: <https://www.irena.org/Publications/2023/Aug/Renewable-Power-Generation-Costs-in-2022>
- 17 International Energy Agency (2023), Will solar PV and wind costs finally begin to fall again in 2023 and 2024?: <https://www.iea.org/reports/renewable-energy-market-update-june-2023/will-solar-pv-and-wind-costs-finally-begin-to-fall-again-in-2023-and-2024>
- 18 See: [The energy transition and its macroeconomic effects](#) (Americo et al., 2023); [Managing Inflation by Boosting Energy Transition. What the ECB should do](#) (Schreiber, 2022); [The cost of financing for renewable power](#) (IRENA, 2023).
- 19 Smoleńska, A., & van 't Klooster, J. (2022), A risky bet: Climate change and the EU's macroprudential framework for banks: https://www.researchgate.net/publication/363109925_A_Risky_Bet_Climate_Change_and_the_EU%27s_Microprudential_Framework_for_Banks
- 20 Ioannidis, M., Hlásková, S. J., & Zilioli, C. (2021), The mandate of the ECB: Legal considerations in the ECB's monetary policy strategy review: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op276~3c53a6755d.en.pdf>
- 21 See: The ECB's role in the European Banking Union (Alexander, 2022, p.156).

- 22 See: [Breaking the tragedy of the horizon—climate change and financial stability](#) (Carney, 2015); [Climate risks and financial stability](#) (Battiston et al., 2022).
- 23 Keynote speech by Frank Elderson (2023), “Come hell or high water”: addressing the risks of climate and environment-related litigation for the banking sector: https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230904_1~9d14ab8648.en.html
- 24 Emambakhsh, T., Fuchs, M., Kordel, S., Kouratzoglou, C., Lelli, C., Pizzeghello, R., Pizzeghello, R. & Spaggiari, M. (2023), The Road to Paris: stress testing the transition towards a net-zero economy: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op328~2c44ee718e.en.pdf?7793485730460e4e0b4e170237eb7429>
- 25 Various terms have been employed in the literature to distinguish between these same two approaches: for instance, ‘proactive’ vs ‘protective’ (Oustry et al., 2022), ‘strong’ vs ‘weak’ (Nikolaïdi and Dafermos), ‘environmental risk exposure approach’ vs ‘environmental footprint approach’ (Dafermos et al., 2023) or ‘single materiality’ vs ‘double materiality’.
- 26 See: [Greening capital requirements](#) (Dafermos & Nikolaïdi, 2022); [Broken promises: The ECB’s widening Paris gap](#) (Dafermos et al., 2023).
- 27 European Central Bank (2023), The Road to Paris: stress testing the transition towards a net-zero economy: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op328~2c44ee718e.en.pdf?7793485730460e4e0b4e170237eb7429>
- 28 See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016F127>
- 29 See: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A12008M003>
- 30 See: [New strategy, new accountability? The European Central Bank and the European Parliament after the strategy review](#). (Grünwald & van ‘t Klooster, 2023); [What to Do with the ECB’s Secondary Mandate](#). (van ‘t Klooster & De Boer, 2023); [The ECB’s neglected secondary mandate](#) (de Boer & van ‘t Klooster, 2021).
- 31 Dalla Costa, A. (2023), EU Parliament offers historic solution on ECB’s secondary objectives: <https://www.positionmoney.eu/2023/02/historic-solution-ecb-secondary-objectives/>
- 32 European Central Bank (2021), ECB presents action plan to include climate change considerations in its monetary policy strategy: https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708_1~f104919225.en.html
- 33 European Central Bank (2022), ECB takes further steps to incorporate climate change into its monetary policy operations: <https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr220704~4f48a72462.en.html>
- 34 See: [Why and how the ECB should go beyond ‘market neutrality’](#) (Jourdan & Del Vasto, 2021); [From market neutrality to market efficiency](#) (Speech by Isabel Schnabel, 2021).
- 35 Bindseil, U., Corsi, M., Sahel, B., & Visser, A. (2017), The Eurosystem collateral framework explained: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op189.en.pdf>
- 36 See: [Decarbonising is easy: Beyond market neutrality in the ECB’s corporate QE](#) (Dafermos et al., 2020); [Greening the Eurosystem collateral framework. How to decarbonise the ECB’s monetary policy](#) (Dafermos et al., 2021); [Broken promises: The ECB’s widening Paris gap](#) (Dafermos et al., 2023); [The climate impact of quantitative easing](#) (Matikainen et al., 2017); [Climate-related risks and central banks’ collateral policy: A methodological experiment](#) (Oustry et al., 2022).
- 37 European Central Bank (2023), FAQ on incorporating climate change considerations into corporate bond purchases: https://www.ecb.europa.eu/mopo/implement/app/html/ecb.faq_cspp_climate_change.en.html
- 38 European Central Bank (2023), Climate-related financial disclosures of the Eurosystem’s corporate sector holdings for monetary policy purposes: https://www.ecb.europa.eu/pub/pdf/other/ecb.climate_related_financial_disclosures_eurosystem_corporate_sector_holdings_monetary_policy_purposes2023~9eae8df8d9.en.pdf
- 39 European Central Bank (2023), Feedback on the input provided by the European Parliament as part of its resolution on the ECB’s Annual Report 2021: https://www.ecb.europa.eu/pub/pdf/other/ecb.20230525_feedback_on_the_input_provided_by_the_european_parliament~92020517af.en.pdf
- 40 European Central Bank (2023), Climate-related financial disclosures of the Eurosystem’s corporate sector holdings for monetary policy purposes: https://www.ecb.europa.eu/pub/pdf/other/ecb.climate_related_financial_disclosures_eurosystem_corporate_sector_holdings_monetary_policy_purposes2023~9eae8df8d9.en.pdf
- 41 While the ECB continues to maintain corporate bonds within the PEPP programme, the scale of holdings is significantly smaller. Specifically, the ECB’s holdings within the APP programme exceed those within the PEPP programme by more than sevenfold.

- 42 As of May 2023, the total stock of bonds under the CSPP was €341 billion. Between June 2023 and June 2024, the total amount of bonds reaching maturity will be a total of €4 billion, slightly less than 10% of the total stock.
- 43 Dafermos, Y., Gabor, D., Nikolaidi, M., Gogolewski, J., & Vargas, M. (2023), Broken promises: the ECB's widening Paris gap: https://www.greenpeace.de/publikationen/EZB_Report%20_Broken_promises.pdf
- 44 See: [The valuation haircuts applied to eligible marketable assets for ECB credit operations](#) (Adler et al., 2023); [The ECB's Collateral Framework from the 1990s until the Pandemic](#) (van't Klooster, 2022).
- 45 Bindseil, U., Corsi, M., Sahel, B., & Visser, A. (2017), The Eurosystem collateral framework explained: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op189.en.pdf>
- 46 See: [Violating the law of one price: the role of non-conventional monetary policy](#) (Corradin & Rodriguez-Moreno, 2016); [Collateral eligibility of corporate debt in the Eurosystem](#) (Pelizzon et al., 2023).
- 47 See: https://www.ecb.europa.eu/press/pr/date/2010/html/sp090728_1annex.en.pdf
- 48 European Central Bank (2022), ECB reviews its risk control framework for credit operations. European Central Bank: https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr221220_1~ca6ca2cc09_mt.html#:~:text=The%20present%20review%20did%20not,against%20climate%2Drelated%20financial%20risks
- 49 Adler, M., Camba-Méndez, G., Džaja, T., Manzanares, A., Metra, M., & Vocalelli, G. (2023), The valuation haircuts applied to eligible marketable assets for ECB credit operations: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op312~3f4457b95c.en.pdf>
- 50 See: [The valuation haircuts applied to eligible marketable assets for ECB credit operations](#) (Adler et al., 2023); [Enhancing climate resilience of monetary policy implementation in the euro area](#) (Aubrechtova et al., 2023).
- 51 Oustry, A., Erkan, B., Svartzman, R., & Weber, P. F. (2022), Climate-related risks and central banks' collateral policy: A methodological experiment: <https://publications.banque-france.fr/en/climate-related-risks-and-central-banks-collateral-policy-methodological-experiment>
- 52 IRENA (2023), The cost of financing for renewable power: <https://www.irena.org/Publications/2023/May/The-cost-of-financing-for-renewable-power>
- 53 See: [Will solar PV and wind costs finally begin to fall again in 2023 and 2024?](#) (IEA, 2023); [Adverse effects of rising interest rates on sustainable energy transitions](#) (Schmidt et al., 2019).
- 54 Bianchi, R., Verbeek, W., & Bender, T. (2023), Impact of rising interest rates on sustainable projects. Business case analysis: <https://www.nvde.nl/wp-content/uploads/2023/06/2023-Impact-of-increased-interest-rates-on-the-businesscase-of-renewables-def.pdf>
- 55 Ferrando, A., Groß, J. & Rariga, J. (2023), Climate change and euro area firms' green investment and financing – results from the SAFE: https://www.ecb.europa.eu/pub/economic-bulletin/focus/2023/html/ecb.ebbox-202306_05~f5ec994b9e.en.html
- 56 Batsaikhan, U. (2022), High interest rates are a threat to the green transition: <https://www.positivemoney.eu/2022/12/high-interest-rates-threat-to-green-transition/>
- 57 See: [Money looking for a home](#) (Batsaikhan & Jourdan 2021) and [High rates are undermining the green transition](#) (Di Luccio, 2023).
- 58 Speech by Isabel Schnabel (2022), A new age of energy inflation: climateflation, fossilflation and greenflation: https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220317_2~dbb3582f0a.en.html
- 59 Vestergaard, J. (2022), Monetary Policy for the Climate? A Money View Perspective on Green Central Banking: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4209718
- 60 Monnet, E., van 't Klooster, J. (2023), Using green credit policy to bring down inflation: what central bankers can learn from history: https://www.inspiregreenfinance.org/wp-content/uploads/2023/07/INSPIRE-Sustainable-Central-Banking-Toolbox_Policy-Briefing-13.pdf
- 61 Dafermos, Y., Gabor, D., Nikolaidi, M., Gogolewski, J., & Vargas, M. (2023), Broken promises: the ECB's widening Paris gap: https://www.greenpeace.de/publikationen/EZB_Report%20_Broken_promises.pdf
- 62 Speech by Isabel Schnabel (2023), Monetary policy tightening and the green transition: <https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230110~21c89bef1b.en.html>
- 63 Reclaim Finance (2023), European Central Bank's asset purchases: Tilting away from EU objectives: <https://reclaimfinance.org/site/en/2023/08/03/european-central-banks-asset-purchases-tilting-away-from-eu-objectives/>

- 64 Reclaim Finance shows that the ECB bought bonds of A2, an Italy-based electric utility, whose direct emissions have soared by 50% since 2020 and scope 3 emissions by 74%: <https://reclaimfinance.org/site/en/2023/08/03/european-central-banks-asset-purchases-tilting-away-from-eu-objectives/>
- 65 See: European Central Bank (2023), Climate-related financial disclosures of the Eurosystem's corporate sector holdings for monetary policy purposes: https://www.ecb.europa.eu/pub/pdf/other/ecb.climate_related_financial_disclosures_eurosystem_corporate_sector_holdings_monetary_policy_purposes2023~9eae8df8d9.en.pdf
- 66 WWF's (2022) 'always environmentally harmful' list provides a clear guide on what type of economic activities and economic sub sectors should be excluded from the ECB's monetary policy operations. See: https://wwfint.awsassets.panda.org/downloads/call_to_action_2022_september.pdf
- 67 Vestergaard, J. (2022), Monetary Policy for the Climate? A Money View Perspective on Green Central Banking: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4209718
- 68 Transition plans are detailed forward-looking accounts on the actions that a firm will pursue to align itself with specific environmental objectives.
- 69 Dafermos, Y., Gabor, D., Nikolaidi, M. & van Lerven, F. (2022). Greening collateral frameworks: https://gala.gre.ac.uk/id/eprint/37781/7/377881_NIKOLAIDI_Greening_collateral_frameworks1.pdf
- 70 The rate of change does not need to be uniform for all values. For example, NGFS illustrates a sliding scale approach with a minimum value, which increases slowly until the firms' carbon intensity reaches the sectoral standard, and then grows quickly. See: <https://www.ngfs.net/en/adapting-central-bank-operations-hotter-world-reviewing-some-options>
- 71 See: [Adapting central bank operations to a hotter world: Reviewing some options](#) (NGFS, 2020); [Greening collateral frameworks](#) (Dafermos et al., 2022).
- 72 NGFS (2020), Adapting central bank operations to a hotter world: Reviewing some options: https://www.ngfs.net/sites/default/files/media/2021/06/17/ngfs_monetary_policy_operations_final.pdf
- 73 European Central Bank (2023), Eurosystem Collateral Data: <https://www.ecb.europa.eu/paym/coll/charts/html/index.en.html>
- 74 See the ESAs-ECB joint statement: https://www.esa.europa.eu/sites/default/documents/files/document_library/Publications/Other%20publications/2023/1052796/ESAs_ECB%20Joint%20Statement%20on%20disclosures%20for%20securitisations.pdf
- 75 BIS (2023), Funding for lending programmes: https://www.bis.org/publ/mc_funding_for_lending_programmes.htm
- 76 Colesanti Senni, C., Sole Pagliari, M. & van 't Klooster, J. (2023), The CO2 content of the TLTRO III scheme and its greening: <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2023/05/The-CO2-content-of-the-TLTRO-III-scheme-and-its-greening.pdf>
- 77 van 't Klooster, J., & van Tilburg, R. (2020), Targeting a sustainable recovery with Green TLTROs: <https://www.positivemoney.eu/wp-content/uploads/2020/09/Green-TLTROs.pdf>
- 78 See: [Money looking for a home](#) (Batsaikhan & Jourdan 2021); [Get your priorities right – Europe must not underestimate the role of banks for the green transition](#) (Mack, 2023).
- 79 Batsaikhan, U., & Jourdan, S. (2021), Money looking for a home: <https://www.positivemoney.eu/2021/02/report-building-renovation-wave-tltros/>
- 80 Speech by Isabel Schnabel (2023), Monetary policy tightening and the green transition: <https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230110~21c89bef1b.en.html>
- 81 See: [Climate-related risks to financial stability](#) (Alogoskoufis et al., 2022); [Climate-related risks to financial stability](#) (Emambakhsh et al., 2022); [The Road to Paris: stress testing the transition towards a net-zero economy](#) (Emambakhsh et al., 2023).
- 82 European Central Bank & European Systemic Risk Board (2022), The macroprudential challenge of climate change: https://www.esrb.europa.eu/pub/pdf/reports/esrb.ecb.climate_report202207~622b791878.en.pdf
- 83 See speeches by Frank Elderson (2023): [Urgent and vitally important: 2023 as a key milestone in stepping up the management of climate and environmental risks](#); ["Running up that hill" – how climate-related and environmental risks turned mainstream in banking supervision and next steps for banks' risk management practices](#)
- 84 Coelho, R & Restoy, F., (2022), The regulatory response to climate risks: some challenges: <https://www.bis.org/fsi/fsibriefs16.htm>

- 85 Coelho, R. & Restoy, F. (2023), Macroprudential policies for addressing climate-related financial risks: challenges and trade-offs: <https://www.bis.org/fsi/fsibriefs18.pdf>
- 86 Hiebert, P. & Monnin, P. (2023), Climate-related systemic risks and macroprudential policy: <https://www.cepreweb.org/climate-related-systemic-risks-and-macroprudential-policy/>
- 87 Dafermos, Y. & Nikolaidi, M. (2022), Greening capital requirements: <https://www.inspiregreenfinance.org/wp-content/uploads/2022/10/INSPIRE-Sustainable-Central-Banking-Toolbox-Policy-Briefing-Paper-8.pdf>
- 88 Emambakhsh, T., Fuchs, M., Kordel, S., Kouratzoglou, C., Lelli, C., Pizzeghello, R., Pizzeghello, R. & Spaggiari, M. (2023), The Road to Paris: stress testing the transition towards a net-zero economy: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op328~2c44ee718e.en.pdf>
- 89 While the ECB is not the sole financial supervisory authority, it has competences in applying macroprudential policies. Under the Single Supervisory Mechanism, it has the ability to apply certain macroprudential measures (e.g. setting additional capital buffers) and the European Systemic Risk Board can issue warnings, recommendations and opinions to ensure the synchronisation of macroprudential policies across the EU.
- 90 See footnote 84.
- 91 Dikau, S., Robins, N., Smoleńska, A., van't Klooster, J., & Volz, U. (2022), Net Zero Transition Plans: A Supervisory Playbook for Prudential Authorities: <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/11/Net-zero-transition-plans-a-supervisory-playbook-for-prudential-authorities.pdf>
- 92 See: [Climate-related systemic risks and macroprudential policy](#) (Hiebert & Monnin, 2023); [Systemic risk buffers—the missing piece in the prudential response to climate risks](#) (Monnin, 2021).
- 93 See: ECB & ESRB (2023), The macroprudential challenge of climate change: https://www.esrb.europa.eu/pub/pdf/reports/esrb.ecb.climate_report202207~622b791878.en.pdf
- 94 Dikau, S., & Volz, U. (2018), Central banking, climate change and green finance: <https://www.adb.org/publications/central-banking-climate-change-and-green-finance>
- 95 See: European Commission (2023), Questions and Answers on the Sustainable Finance package: https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_3194
- 96 EIB (2021), Investment Report 2020/2021. Building a Smart and Green Europe in the COVID-19 Era: <https://www.eib.org/en/publications/investment-report-2020>
- 97 Grimm, V., Nöh, L., & Wieland, V. (2023), Government bond rates and interest expenditure of large euro area member states: A scenario analysis: <https://onlinelibrary.wiley.com/doi/full/10.1111/infj.12434>
- 98 European Commission (2023), 2023 Strategic Foresight Report. Sustainability and people's wellbeing at the heart of Europe's Open Strategic Autonomy: https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3623
- 99 European Environment Agency (2019), Projected welfare impacts of climate change for different EU regions and sectors for two emissions scenarios: <https://www.eea.europa.eu/data-and-maps/figures/projected-welfare-impacts-of-climate>
- 100 The government bond spread is calculated as the difference between Eurozone governments' bond yields and those of Germany.
- 101 Breunig, C., & Busemeyer, M. R. (2012), Fiscal austerity and the trade-off between public investment and social spending: <https://d-nb.info/1097268241/34>
- 102 Opening remarks by Panetta, F. (2023), Investing in tomorrow: Future-proofing fiscal policies and governance in Europe: <https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230920~c21e96e03f.en.html>
- 103 Delgado-Téllez, M., Ferdinandusse, M., & Nerlich, C. (2022), Fiscal policies to mitigate climate change in the euro area: https://www.ecb.europa.eu/pub/economic-bulletin/articles/2022/html/ecb.ebart202206_01~8324008da7.en.html
- 104 Fahr, S., Giuzio, M., Pourtalet, C. M. S., Spaggiari, M., & Simon, J. M. V. (2023), Climate change and sovereign risk: https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart202305_03~f51dd11fd7.en.html
- 105 EIB (2023), Investment Report 2022/2023. Resilience and renewal in Europe: <https://www.eib.org/en/publications/20220211-investment-report-2022>
- 106 See: [A real European safe asset: The purchase of EIB bonds by the Eurosystem](#) (Batsaikhan & Laurentjoye, 2020); [The Eurozone's evolving fiscal ecosystem: Mitigating fiscal discipline by governing through off-balance-sheet fiscal agencies](#) (Guter-Sandu & Murau, 2022).

- 107 EMBER (2023), Power in Unity. Doubling electricity interconnection can boost Europe's green transition and strengthen security of supply: <https://ember-climate.org/insights/research/breaking-borders-europe-electricity-interconnectors/#supporting-material>
- 108 Claey's, G., McCaffrey, C., & Welslau, L. (2023), The rising cost of European Union borrowing and what to do about it: <https://www.bruegel.org/sites/default/files/2023-06/PB%2012%202023.pdf>
- 109 Avgousti, A., Caprioli, F., Caracciolo, G., Cochard, M., Dallari, P., Delgado-Téllez, M., Domingues, J., Ferdinandusse, M., Filip, D., Nerlich, C., Prammer, D., Schmidt, K., & Theofilakou, A. (2023), The climate change challenge and fiscal instruments and policies in the EU: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op315~c279c7c290.en.pdf>
- 110 In 2021, economic losses from climate-related extremes reached maximums, at €56.6 billion (EEA, 2023).
- 111 Fahr, S., Giuzio, M., Pourtalet, C. M. S., Spaggiari, M., & Simon, J. M. V. (2023), Climate change and sovereign risk: https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart202305_03~f51dd11fd7.en.html
- 112 See: Panetta, F. (2023), Investing in tomorrow: Future-proofing fiscal policies and governance in Europe: <https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230920~c21e96e03f.en.html>
- 113 Schuster, F. (2023), Sovereign Spreads, Central Bank Collateral Frameworks, and Periphery Premia in the Eurozone: <https://www.dezernatzukunft.org/wp-content/uploads/2023/07/Schuster-F.-2023-Sovereign-Spreads-Central-Bank-Collateral-Frameworks-and-Periphery-Premia-in-the-Eurozone.pdf>
- 114 See: [Central Banks Caught Between Market Liquidity and Fiscal Disciplining: A Money View Perspective on Collateral Policy](#) (Gabor & Vestergaard, 2021); [The politics of the ECB's market-based approach to government debt](#) (van 't Klooster, 2023).
- 115 Vestergaard, J., & Gabor, D. (2021), Central Banks Caught Between Market Liquidity and Fiscal Disciplining: A Money View Perspective on Collateral Policy: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3980953
- 116 Orphanides, A. (2017), ECB monetary policy and euro area governance: Collateral eligibility criteria for sovereign debt: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3076184
- 117 See: Bakker, C., Bortolussi, L., Büssing-Lörcks, M., Fudulache, A. E., Gomes, D., Pavlova, I., & Sauer, S. (2022), Gradual phasing-out of pandemic collateral easing measures: https://www.ecb.europa.eu/pub/economic-bulletin/focus/2022/html/ecb.ebbox202203_07~441fce9f64.en.html
- 118 Christine Lagarde (2023), Remarks delivered at the Bank of Greece on the occasion of the external Governing Council monetary policy meeting in Athens: <https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp231025~edcc5ca1db.en.html>
- 119 Abdelli, M., & Batsaikhan, U. (2022), Driving sustainability from within. The role of central banks' credit rating in mitigating climate and environmental risks: <https://www.positivemoney.eu/2022/02/central-banks-credit-rating-climate/>
- 120 Alberola, E., Cheng, G., Consiglio, A., & Zenios, S. A. (2022), Debt sustainability and monetary policy: the case of ECB asset purchases: <https://www.bis.org/publ/work1034.htm>

A roadmap towards greening the European Central Bank

Mitigating climate change and environmental degradation stands as one of the most pressing societal challenges for the foreseeable future. The far-reaching implications of climate change hold significant consequences for the operations of the European Central Bank (ECB). Notably, the volatile nature of fossil fuel prices, a key driver of climate change, poses a direct threat to the ECB's core mandate of achieving price stability. Rising global temperatures, coupled with the increasing frequency and intensity of extreme weather events, contribute to inflationary pressures, which are expected to amplify as climate change intensifies. Additionally, climate change introduces systemic risks to financial stability, which will only worsen if left unaddressed. It is, therefore, entirely justified, and necessary, within the framework of its primary mandate, for the ECB to take ambitious action to mitigate climate change. Furthermore, the ECB is obligated by its secondary mandate to support the European Union's efforts to accelerate the green transition. The ECB must adopt a proactive environmental stance. This entails that the ECB takes into account the broader environmental consequences of its policies. Such an approach would serve as a more fitting guiding principle, given the magnitude of the challenges that climate change entails.

ISBN 978-9-46494421-1