IN-DEPTH ANALYSIS

Requested by the ECON Committee

Monetary Dialogue Papers, November 2023

European Parliament

Climate Change and Monetary Policy: Risks, instruments, & chances

Economic Governance and EMU Scrutiny Unit (EGOV)
Directorate-General for Internal Policies
PE 755.708 – November 2023

EN

Climate Change and Monetary Policy: Risks, instruments, & chances

Abstract

Rising inflation complicates the alignment of the ECB's policies with the Paris Agreement. This paper provides novel evidence for inflationary pressures arising from natural disasters. We then discuss the effectiveness of monetary instruments to boost a green transition, concluding that the scope of policy measures used thus far is limited. As additional measures, we advise active rebalancing of the ECB's bond holdings towards greener issuers, enforcing stricter disclosure standards, and differentiating lending facilities in favour of green investments.

This document was provided by the Economic Governance and EMU Scrutiny Unit at the request of the Committee on Economic and Monetary Affairs (ECON) ahead of the Monetary Dialogue with the ECB President on 27 November 2023.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.

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Original: EN

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Manuscript completed in November 2023

This document was prepared as part of a series on "Climate change considerations in monetary policy implementation", available on the internet at:
https://www.europarl.europa.eu/committees/en/econ/econ-policies/monetary-dialogue

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LIST OF ABBREVIATIONS

ABSPP	Asset-backed securities purchase programme
APP	Asset purchase programme
CBPP3	Third covered bond purchase programme
CRED	Centre for Research on the Epidemiology of Disasters
ECB	European Central Bank
EP	European Parliament
ESG	Environmental Social Governance
EU	European Union
GDP	Gross domestic product
HICP	Harmonised index of consumer prices
IPCC	Intergovernmental Panel on Climate Change
PEPP	Pandemic emergency purchase programme
PSPP	Public sector purchase programme
PSVAR	Panel structural vector autoregression
TLTRO	Targeted longer-term refinancing operations
TPI	Transmission protection instrument
CSPP	Corporate sector purchase programme

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EXECUTIVE SUMMARY

- Since 2020, European Central Bank (ECB) Executive Board Members have become increasingly vocal regarding monetary policy and climate change. Indeed, rising inflation complicates the alignment of the ECB's policies with the Paris Agreement. Novel research shows that **natural disasters have a positive effect on average inflation rates in euro area countries**. Zooming in on sub-indices, effects are dispersed: **price increases in product categories that are especially important for low-income households are more pronounced**.
- The ECB is contributing to fighting climate change within its secondary mandate. **Current inflationary pressures narrow the scope for climate-targeted policies**: the phasing out of the asset purchase programme (APP) prevents a further tilting of the ECB's bond holdings to greener alternatives. Additionally, higher interest rates disadvantage investment in innovation and renewable energies due to high up-front costs in these areas.
- Furthermore, **the ECB's bond holdings under the corporate sector purchase programme (CSPP) display a bias towards climate-harming sectors.** However, the CSPP has both an important impact on reducing the cost of debt financing for eligible firms and on the issuance activity of eligible firms.
- **Any reinvestment tilted towards climate-friendlier issuers will be small in comparison to the large stock of existing overall holdings.** The ECB has implemented the greening of its corporate bond holdings as of October 2022. However, reinvestments under the larger APP stopped as of July, and the remaining reinvestments under the PEPP represent only 12% of the ECB's total corporate sector bond holdings.
- **The ECB should rebalance its portfolio by actively selling positions** since a tilting of the portfolio towards climate-friendly issuers - absent any reinvestments in the near future - remains necessary to decarbonise the bond portfolio.
- **As regards its collateral framework, the ECB should favour both the eligibility of bonds and loans stemming from corporates with a superior climate-performance to boost a green transition.** Changes in the ECB collateral framework have a sizeable impact on the real economy. So far, the ECB's collateral framework implicitly encourages fossil fuel companies to tap bond markets. Preferential treatment of green bonds in the collateral framework, in particular, boosts the supply of green bonds, leading to an increase in green investment.
- **More action in terms of disclosure standards is appropriate**. Concerns regarding the quality of emission disclosure and the credibility and comparability of disclosed information have been raised. Research finds that **mandatory carbon disclosure significantly lowers the cost of capital for reporting companies**. Total emissions fall upon firm disclosure, suggesting a certain degree of disciplining effect coming from disclosure requirements.
- **More favourable interest rates should be offered for climate-friendly investments.** This measure does not conflict with price stability since the ECB can react to inflationary pressures as mandated by means of its main refinancing operations. Fostering investment in green technologies and innovation allows for a quicker transition to a green economy. Reducing the dependence on fossil sectors, in turn, diminishes the exposure of the euro area to supply shocks in this sector, an important driver of rising inflation rates - as recently experienced due to the war in Ukraine.

1. INTRODUCTION

Since taking office, European Central Bank (ECB) President Christine Lagarde has consistently highlighted the ECB's intention to fight climate change within the scope of its mandate. In July 2021, the ECB announced concrete actions by, for instance, making green considerations part of its collateral framework, its asset purchases, its forecasting, and its policy making[1]. One year later, the ECB started adjusting the reinvestments of the corporate bond holdings based on a climate score, reflecting the issuers climate performance.

In this briefing paper, we first discuss evidence that necessitates a reconsideration of monetary policy making in light of climate change (section 2). Relying on data from 1996 to 2021, Beirne et al. (2023) find that, in the short run, natural disasters raise headline and core inflation on average across countries. As climate change advances, the frequency and intensity of natural disasters is expected to rise[2], most likely increasing upward pressure on inflation. Moreover, the impact of natural disasters on more granular price indices is dispersed: goods especially important for low-income households see a more pronounced price increase. This gives rise to distributional concerns.

Next to the relevance of climate change for monetary policy considerations, another question that arises is how the ECB can contribute to mitigating climate change. Current inflationary pressures constrain the further use of instruments employed thus far. As a side effect of its ambitions to reduce its balance sheet, tilting of the ECB's corporate bond holdings to climate-friendly alternatives through reinvestments drops out of the ECB's toolkit[3]. Furthermore, to counter inflation, the ECB has been increasing interest rates. However, high interest rates discriminate against technological innovation and the production of renewable energy due to large up-front costs in these sectors[4].

Therefore, in this briefing, we discuss alternative green monetary policy instruments that could be used and that do not conflict with the current need to fight inflation (section 3). We point to the importance of an active re-shuffling of the bond portfolio to climate-friendlier issuers. The collateral framework is another margin the ECB employs to align its operations with the Paris Agreement. Importantly, research attests implications on the real economy and on emissions to a greening of the collateral framework. Finally, we stress the current shortcomings of disclosure standards and the importance of high-quality data for all climate-related monetary policies and their direct impact on emissions.

All in all, it is questionable whether these measures suffice to align ECB policy with its climate-related targets[5] - even more so in the light of an existing carbon-bias in the ECB's balance sheet and disadvantageous high interest rates. Therefore, we close by suggesting ways that monetary policy can be further geared towards supporting the EU's compliance with the Paris Agreement (section 4). Offering advantageous refinancing facilities for climate-friendly investments qualifies as such an instrument[6]. They would help alleviate the negative impacts of the current contractionary monetary policy on green investment. Importantly, differentiated lending facilities can be implemented without violating the ECB's mandate of price stability. In contrast, they would boost a transition away from the fossil fuels that have caused inflationary turmoil in the past.

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1 ECB (2021c).

2 IPCC (2023). For a brief overview see: https://www.ipcc.ch/report/ar6/syr/resources/spm-headline-statements/ .

3 Schnabel (2023).

4 Schnabel (2023).

5 Schnabel (2023).

6 Kriwoluzky and Volz (2023).

2. THE EFFECTS OF CLIMATE CHANGE ON INFLATION

"Climate change affects inflation, and inflation is the beast that all central bankers — whether they wear a green jacket or not — want to tame and discipline."

Christine Lagarde, Summit for a New Global Financing Pact, Paris, June 23, 2023.

Climate change represents one of the major threats to our societies, both today and in the future. Despite this, it was only recently that the ECB made a decision to include climate change within its decision-making and monetary policy operations[7]. Up to now, little is known about the potential effects of climate change – and the implied surge in the prevalence and severity of climate-associated disaster events[8] – on the ECB's main objective of preserving price stability. In this section, we discuss findings from Beirne et al. (2023), who contribute to this debate and estimate the effects of natural disasters on inflation rates in euro area countries from 1996 through 2021.

2.1. Transmission Channels

Natural disasters, as posited by theory, can exert upward and downward pressures on inflation rates through different transmission channels[9]. Inflation may rise due to the destruction of infrastructure, harvests, and buildings or because of production and supply chains being disrupted[10]. These negative shocks can increase domestic production costs and create spillovers to foreign importing countries. Moreover, damages to the infrastructure and the potential need to replace domestically produced goods by imported ones may lead to surges in transportation costs, thereby inducing price increases and spillover effects to other countries[11]. Natural disasters may also create upward price pressures via the demand side: efforts to rebuild destroyed infrastructure can cause a temporary rise in prices for reconstruction goods.

Conversely, inflation may also decrease following a natural disaster[12]. As an illustration, firms may suffer a decline in profit-earning capacity after the destruction of production plants or physical capital. Likewise, the destruction of private homes reduces wealth. Both may lead to declines in investment by firms and household consumption[13]. In addition, increased defaulting of loans after the occurrence of natural disasters may reduce credit supply by banks, further exacerbating the reduction in investment and consumption.

Given these upward and downward forces on prices, the reaction of inflation to natural disasters is unclear. Whether the price level ultimately rises or falls depends on which countervailing dynamic dominates. Furthermore, prices for some items might decline, while others may rise. The empirical analysis seeks at clarifying which of these pressures are predominant for core and headline inflation, and for their 12 primary sub-indices.

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7 ECB (2021a, 2021b).

8 IPCC (2012) and Simola (2020).

9 This section draws on Dafermos et al. (2021).

10 See Batten et al. (2020) and Simola (2020).

11 Klomp and Sseruyange (2021).

12 Doyle and Noy (2015).

13 This may still hold true even if firms and individuals have been insured against disaster-related losses; first, since insurance costs might decrease investment and consumption and, second, because the cost of insurance might rise, if the frequency and severity of natural disasters increases due to climate change.

2.2. Empirical Evidence

To estimate the effects of natural disasters on headline inflation and its main sub-indices, Beirne et al. (2023) use monthly data from January 1996 through March 2021 for 19 euro area countries[14]. Details on the empirical methodology are presented in the Annex.

The authors employ disaster-related data on droughts, floods, storms, temperature extremes, wildfires, earthquakes, and volcanic activity alongside their estimated monetary damages[15]. To standardise across countries, damages are divided by monthly gross domestic product (GDP) of the respective economy, following Fratzscher et al. (2020). Consequently, the disaster variable measures the monetary damage of an event in percent of GDP[16]. To assess the effects on core and headline inflation, as well as on the 12 sub-indices thereof, Beirne et al. (2023) employ data from the Harmonised Index of Consumer Prices (HICP) for countries in the euro area. This approach benefits from the fact that the statistical data compilation methods are standardised across countries, allowing for better cross-country comparability than data from national sources. In addition, the HICP represents the main target variable pertaining to ECB monetary policy.

To begin with, the authors discuss how headline and core[17] inflation are affected by estimated monetary damages resulting from natural disasters in euro area countries. Figure 1 illustrates that a disaster shock of one percentage point of monthly GDP significantly raises average monthly headline inflation rates in euro area countries by almost 0.2 percentage points immediately after the disaster strikes[18]. This suggests that upward forces on prices, originating from resource constraints after infrastructure, harvests, and buildings have been destroyed, are predominant in the immediate aftermath of a disaster. Downward price pressures continue to bite also over the subsequent month before the effects become insignificant and dissipate three months after the disaster. For average core inflation rates, a comparable pattern emerges as for headline inflation.

As the focus on headline and core inflation cannot reveal potentially opposing price responses in different sectors, we next zoom in on a more disaggregate level. Figure 2 shows the effects for the 12 sub-indices of headline inflation. There is substantial heterogeneity in the inflation response to disaster shocks, with consumer prices rising in some sectors and falling in others. More precisely, prices for clothing, education, electricity, food, health, household equipment, housing, restaurants, as well as for miscellaneous goods increase significantly following a disaster. This indicates that supply-side effects prevail for these consumption categories. On the other hand, communication and transport prices decline instantaneously after disasters, which implies that the demand for the goods and services produced by these sectors is more susceptible to disaster events. For other sub-indices, no meaningful

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14 Croatia is excluded from the analysis as this country became part of the euro area only in 2023.

15 The data is retrieved from the EM-DAT database and collected by the Centre for Research on the Epidemiology of Disasters (CRED). In the considered sample, the EM-DAT database contains 245 natural disasters with reported estimated monetary damages. Earthquakes and volcanic activity are not directly related to climate change, but rather result from tectonic processes. As they make up less than 9% of disasters in the sample and excluding them does not significantly change the results, they are kept in the analysis.

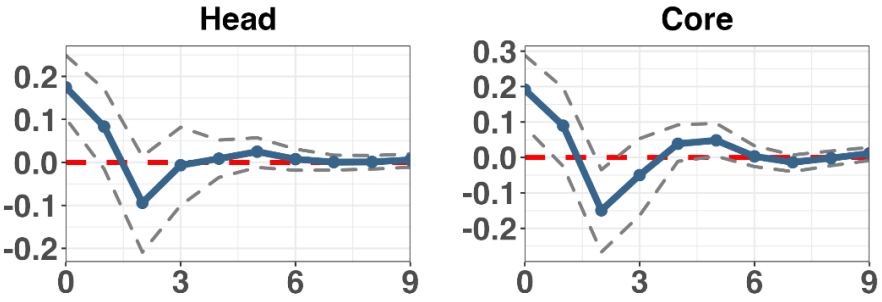
16 The average estimated damage per disaster amounts to 1.58% of monthly national GDP, with values ranging from 0 to 35.87% (for the Athens earthquake from 1999).

17 Core inflation excludes items from the more volatile sectors of energy, food and beverages, as well as of alcohol and tobacco.

18 More precisely, Figure 1 displays the impulse response functions of average monthly headline and core inflation to natural disaster shocks, together with 95% confidence intervals. Confidence intervals are generated by Monte Carlo simulations using 500 repetitions. Impulse responses describe the reaction and evolution of inflation rates in response to a shock to the disaster variable. The probability that the true value of inflation rates lies within the area of the dashed lines, the confidence intervals, is at 95%. Beirne et al. (2023) look at monthly inflation rates following Heinen et al. (2018), while the ECB's main target variable is year-on-year inflation. To achieve a 2% yearly inflation rate requires a month-over-month inflation rate of only 0.17%, suggesting that moderate month-over-month effects on inflation rates suffice to aggregate to significant changes in year-on-year inflation.

effects are discerned. Consistent with the results obtained for average core and headline inflation rates in euro area countries, the sub-index responses of inflation to natural disasters tend to diminish after two months and converge to zero after three to four months.

Figure 1: Effects of natural disaster shocks on headline and core inflation



Source: Beirne et al. (2023).

Notes: Impulse response functions are displayed, together with 95% confidence intervals in dashed lines. The size of the disaster shock amounts to one percentage point of monthly GDP. The horizontal axes show the months after the disaster strikes.

Beirne et al. (2023) detect notable price increases for some sub-indices, such as for food and beverages. This sharp rise in food price inflation following natural disasters also raises concerns about the distributional effects. Since low-income households tend to allocate a larger proportion of their income to food expenditures[19], they are also more adversely affected when food price inflation rises compared to high-income households.

Overall, the study's results on the inflationary effects of natural disasters in euro area countries can be summarised by the following three points:

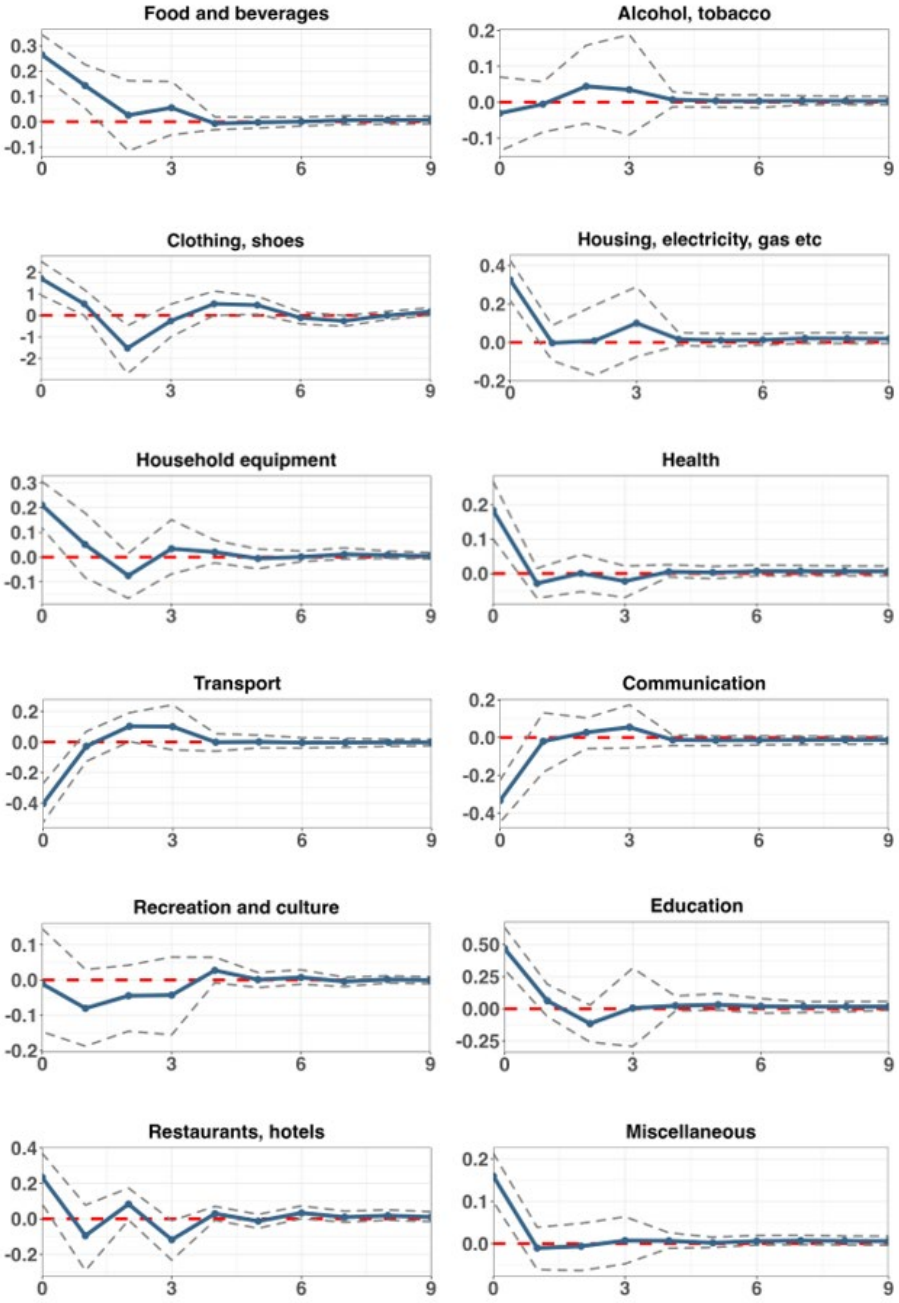
- Natural disaster shocks result in significant increases in both core and headline inflation rates.
- Substantial disparities occur across sub-indices, with strongest increases in prices for clothing, education, food and beverages, and housing.
- These price effects cause surges in inflation rates and may thereby jeopardise the ECB's efforts to achieve price stability. They also raise distributional concerns.

Despite the backward-looking nature of the analysis, it has important ramifications for the future conduct of monetary policy in the euro area due to an expected rise in disaster risk. As emphasised in the most recent assessment report by the Intergovernmental Panel on Climate Change (IPCC)[20], climate change has non-linear effects: after surpassing the 1.5 degree threshold, the economic costs of climate change are likely to increase.

19 ECB (2022b).

20 IPCC (2023).

Figure 2: Effects of natural disaster shocks on inflation sub-indices



Source: Beirne et al. (2023).

Notes: Impulse response functions are displayed, together with 95% confidence intervals in dashed lines. The size of the disaster shock amounts to one percentage point of monthly GDP. The horizontal axes show the months after the disaster strikes.

3. INSTRUMENTS OF GREEN MONETARY POLICY

The ECB has several instruments at its disposal to achieve the goal of actively fighting climate change by "greening" its monetary policy, even in times of high interest rates. This section discusses the mechanisms and the effectiveness of available instruments.

3.1. Corporate Sector Purchase Programme

In the aftermath of the Great Financial Crisis and the sovereign debt crisis in the euro area, the ECB implemented the asset purchase programme (APP) with the objective of supporting the monetary policy transmission mechanism to ensure inflation rates sufficiently close to the target of two percent. Within the APP[21], the corporate sector purchase programme (CSPP) was announced in April 2016 and implemented in June 2016. This programme targeted bonds issued by corporations headquartered within the euro area and aimed at decreasing their borrowing costs on the bond market. Additionally, the ECB rolled out the Pandemic Emergency Purchase Programme (PEPP) in March 2020, a temporary asset purchase programme of private and public sector securities, to counter the serious risks to the monetary policy transmission due to the coronavirus pandemic.

In the following years, purchases were guided by the principle of "market neutrality", thus avoiding market distortions, where purchases mirror the outstanding amount issued in the universe of eligible corporate bonds. At the end of 2022, the corporate holdings amounted to EUR 385.2 billion (Table 1), with APP holdings responsible for 88% of the outstanding amount (EUR 339 billion) and PEPP holdings for the remaining 12% (EUR 46.2 billion).

The CSPP has had both an important impact on reducing the cost of debt financing for eligible firms and on their issuance activity. At the same time, the resulting portfolio of corporate bonds held by the ECB is biased towards more carbon-intensive firms[22]. Such firms have higher investment needs, thereby representing a disproportionate share of the investable universe. As a result, any benefit of eligibility for ECB bond purchases was first and foremost harvested by carbon-intensive firms.

Table 1 provides an overview of the climate risk exposure of the aggregated ECB's corporate sector portfolio. The ECB proposed four main metrics: the weighted average carbon intensity (WACI), carbon intensity, total carbon emissions, and the carbon footprint measured in tons of CO_2-equivalent (tCO_2e) per EUR million invested. Between 2018 and 2022, the climate risk of the ECB's overall corporate portfolio decreased significantly from 238 to 166 tCO_2e per EUR million[23]. This decrease is mainly due to issuers becoming more carbon efficient.

Only since October 2022 has the ECB also been actively contributing to reducing climate risk in its portfolio of corporate assets by actively steering the reinvestment of its asset purchases away from companies with high carbon emissions[24]. This had a sizeable impact on the market: the announcement alone reduced the eligible green bond's yield-to-maturities by 4 basis points relative to eligible

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21 The APP consists of the corporate sector purchase programme (CSPP), the public sector purchase programme (PSPP), the asset-backed securities purchase programme (ABSPP), and the third covered bond purchase programme (CBPP3).

22 Papoutsi et al. (2021).

23 For more details, see https://www.ecb.europa.eu/pub/pdf/other/ecb.climate_related_financial_disclosures_eurosystem_corporate_sector_holdings_monetary_policy_purposes2023~9eae8df8d9.en.pdf .

24 The initial press release referring to the announcement is from July 8, 2021 (ECB, 2021c). Regarding implementation, see press release ECB https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr220919~fae53c59bd.en.html .

conventional bonds and, consequently, increased the issuance of green bonds in the market[25]. However, as of July 2023, the ECB stopped reinvesting the principal payments of maturing corporate debt under the APP and will most likely stop doing so under the PEPP at the end of 2024. Given the relatively smaller size of the PEPP corporate holdings (only 12% of total holdings), any reinvestment tilted towards climate-friendlier issuers will be small in comparison to the large stock of existing overall holdings.

The question arises: what alternative instruments does the ECB have at its disposal to achieve a greener portfolio? One option – in addition to tilting the comparatively small reinvestments in a climate-friendly way for the next remaining months – is to actively rebalance the entire corporate bond portfolio held at the ECB toward issuers with a better climate performance. This is certainly against the "held to maturity" policy underlying the ECB's purchases so far. Re-shuffling the corporate portfolio would imply actively selling positions (and not waiting until maturity). However, such a policy helps to safeguard better financing conditions of green investments even in times of rising borrowing costs, as recently highlighted by Isabel Schnabel, current member of the ECB Executive Board[26].

[25] Eliet-Doillet and Maino (2023).

[26] Schnabel (2023).

Table 1: Financial and climate-related disclosure metrics for the ECB's corporate sector portfolios

	2018	2019	2020	2021	2022
Portfolio size (EUR bn, nominal amounts)	**173.1**	**180.3**	**287.5**	**345.5**	**385.2**
Portfolio size (EUR bn, book value)	180.3	187.7	297.1	357.4	394.7
Weighted Average Carbon Intensity (tCO_2e per EUR million revenue)	372	316	289	267	262
Coverage (percentages)	91%	92%	96%	96%	96%
Total carbon emissions (scope 1 & 2 emissions in mega tCO_2e)	37	32	47	55	60
Coverage (percentages)	90%	91%	95%	94%	94%
Carbon footprint (tCO_2e per EUR million invested)	238	195	173	169	166
Coverage	90%	91%	95%	94%	94%
Carbon intensity (tCO_2e per EUR million revenue)	385	332	310	292	284
Coverage	90%	91%	95%	94%	94%

Source: Climate-related financial disclosures of the ECB's corporate sector holdings for monetary policy purposes, March 2023; Available here: https://www.ecb.europa.eu/pub/pdf/other/ecb.climate_related_financial_disclosures_eurosystem_corporate_sector_holdings_monetary_policy_purposes2023~9eae8df8d9.en.pdf

Note: "Coverage (percentages)" indicates data availability, calculated as the percentage of investments for which all required data (i.e., emissions and financial data) are available. "tCO_2e" stands in for "tons of CO_2 equivalent", the measure of emissions. Values refer to year-end of the aggregate portfolio of corporate assets.

3.2. Green Collateral Framework

Another margin to contribute to climate change mitigation – or at least to not spur greenhouse-gas emissions – is the ECB's collateral framework. It specifies the list of assets banks can pledge to enter the ECB's refinancing operations. Indeed, the ECB only lends to the banking sector against collateral, defined both in terms of asset eligibility and in terms of haircuts applied to the respective assets to compensate for their riskiness. A peculiarity of the ECB's collateral framework is that it accepts various asset classes across a wide range of credit ratings, ranging from corporate and government bonds, covered and uncovered bank bonds, to asset-backed securities.

Recent empirical studies point to collateral framework policies having an impact on the real economy. In terms of eligible loans, the amount of collateral available to banks influences their lending decisions[27]. Firms exposed to banks affected by the change in the collateral framework experience a relaxation of borrowing constraints and increase their real activity. In terms of eligible bonds, research

[27] For the household sector, see Van Bekkum et al. (2017). For the corporate sector, see Mesonnier et al. (2021) and Hüttl and Kaldorf (2023).

documents an "eligibility premium" on eligible bonds, which decreases their yield-to-maturities relative to non-eligible bonds. Subsequently, the issuance of eligible bonds in the market also increases. These are sizeable effects. Preferential treatment of green bonds in the collateral framework, in particular, boosts the supply of green bonds, leading to an increase in green investment. Favouring both bonds and loans stemming from corporations with a better climate-performance could therefore be an important instrument to actively contribute to a green transition of the economy.

Up until recently, however, the existing collateral framework did not have any climate policy dimension. In contrast, the collateral framework of the ECB exerts a carbon bias: companies with high carbon intensity issue 59% of corporate bonds accepted as collateral by the ECB, despite contributing less than 24% and 29% to European Union (EU) employment and Gross Value Added, respectively[28]. Additionally, the collateral framework of the ECB implicitly incentivises fossil fuel companies to tap bond markets, with the four largest (mostly gas) fossil fuel companies relying on bonds that are subsidised by the collateral framework of the ECB for over half of their overall financing[29].

Given the significant ramifications for capital allocation and market prices, a greening of monetary policy crucially depends on greening its collateral framework. The ECB took steps to incorporate the collateral framework in its climate action plan: after kicking off the green monetary policy debate in 2021, the ECB Governing Council strengthened the use of the collateral framework to account for the EU's climate targets in July 2022[30]:

- In terms of assets included, the ECB committed to limiting the pledgeability of assets issued by firms with a high carbon footprint by end-2024. These limits will first apply to corporate bonds, with additional asset classes being added as the quality of climate-related data improves.
- In terms of haircuts, the ECB started considering climate change risks when reviewing haircuts applied to corporate bonds used as collateral.
- In terms of disclosure, the ECB is making climate-related corporate disclosures compulsory for bonds to remain eligible as collateral in refinancing operations by the end of 2026.
- In terms of risk assessment and management, the Eurosystem agreed on a set of common minimum standards for how national central banks' in-house credit assessment systems should include climate-related risks in their ratings. These standards will enter into force by the end of 2024.

A more climate-friendly collateral framework is especially important under current high interest rates. In an environment with rising interest rates, the green transition is becoming more difficult to implement since financing investments in green technologies and innovation is more expensive. It is, therefore, paramount that the greening of the collateral framework continues – at least – as laid down in the ECB communication, thereby alleviating negative effects of rising interest rates.

[28] Dafermos et al. (2021).

[29] Dafermos et al. (2021).

[30] In July 2021, the ECB published a first proposal on incorporating climate change into its monetary policy operations (ECB, 2021c). In July 2022, the ECB specified further details regarding climate change and its corporate bond purchases, collateral framework, disclosure requirements and risk management (ECB, 2022a).

3.3. Data Availability

Taken together, the collateral framework, as well as the unconventional monetary policy programmes can contribute to greening monetary policy. Underlying all of this, however, lies the availability of reliable, standardised, accurate data on the climate risk of firms and their financial assets.

Given that loans to the corporate sector are an important part of eligibles in the ECB's collateral framework, any climate-related eligibility criteria must build on the relevant information at the counterparty level and, hence, on banks capacity to identify, manage, and monitor climate risk of their loan portfolio.

A first stocktaking of climate-risk related data availability from the bank's side was the ECB bottom-up climate-risk bank stress test conducted in July 2022[31]. The ECB itself stated the availability of climate-related data as one of the main challenges. Banks use sectoral data instead of firm level data for carbon emissions and emission intensity. However, at the company level, emissions are quite heterogeneous[32]. Similarly, in November 2022, the ECB concluded its thematic review on climate-related and environmental risks of 186 banks and found that, while progress is being made, less than 10% of institutions use sufficiently forward-looking climate and risk information at the counterparty level in their governance and risk management practices[33].

At the same time, researchers and policy makers alike raise concerns regarding diverse approaches in carbon disclosure, the quality of emission disclosures, as well as the credibility and comparability of disclosed information. Recent research finds that mandatory carbon disclosure significantly lowers the cost of capital for reporting companies. Additionally, total emissions fall following firm disclosures, suggesting a certain degree of disciplining coming from disclosure requirements[34].

Together with the Corporate Sustainability Reporting Directive, which expands Environmental Social Governance (ESG) reporting obligations in the European Union, the ECB's quest to make climate-related corporate disclosures compulsory for bonds and loans to remain eligible as collateral in refinancing operations by end-2026 is an important endeavour.

31 ECB (2022d).

32 For a discussion of the stress test see https://wpsf.de/wp-content/uploads/2022/09/WPSF_PB_6_2022-ECB_Stresstest.pdf .

33 ECB (2022c).

34 Bolton and Kacperczyk (2021).

4. CONCLUSION AND POLICY RECOMMENDATIONS

Rising inflation rates in the euro area have called for a contractionary monetary policy response. The ECB has been increasing interest rates and reducing its balance sheet. High interest rates discriminate against technological innovation and the production of renewable energy due to large upfront costs in these sectors[35]. The phasing out of the APP excludes reinvestments that tilt the ECB's bond holdings to more climate-friendly alternatives reflecting a greener monetary policy. These developments complicate the ECB's intention to align its policy with the climate targets stipulated in the Paris Agreement.

In this policy briefing, we show that natural disasters – which will occur more frequently and severely as climate change advances – push inflation up. This underlines the necessity to incorporate climate-change considerations in the ECB's policymaking. Furthermore, inflationary pressures are dispersed across sectors pointing to distributional effects. Further, we note that the current composition of corporate bond holdings and the bias of the collateral framework towards carbon-intensive issuers run counter climate protection.

We next discuss policy options that are still available for the ECB to shift its operations towards climate neutrality. Both the tilting of the remaining reinvestments stemming from the corporate bond holdings as well as the collateral framework are two options. While the collateral framework allows pushing for climate-friendlier assets, thus inducing a diminishing effect on emissions, the tilting options of the remaining reinvestments are, however, limited in scope. These considerations, in combination with disadvantageously high interest rates, let us conclude that additional unconventional policies are inevitable if climate goals should be met. Therefore, we argue for an active re-balancing of the ECB's corporate bond holdings towards issuers with a better climate performance.

Another suitable instrument that has seen less attention in ECB communications is the discrimination of refinancing facilities. More favourable interest rates may be offered for climate-friendly investments. This measure does not conflict with price stability since the ECB can react to inflationary pressures as mandated by means of its main refinancing operations. Fostering investment in green technologies and innovation allows for a quicker transition to a green economy. Reducing the dependence on fossil sectors, in turn, diminishes the exposure of the euro area to supply shocks in this sector, an important driver of rising inflation rates – as recently experienced because of the Russian war in Ukraine. Knowledge on the mechanisms of this unconventional policy is scarce. Filling the gap would be an important endeavour for future research.

After having discussed adequate policy instruments, we think a word of caution is in order. The greening of monetary policy firmly depends on knowledge about emissions associated with financial products. Open questions must be addressed: On what criteria shall a "green bond taxonomy" be founded? What institution should be responsible for the classification? How can "greenwashing" incentives of firms be prevented? Answering these questions is of vital importance for the future conduct of monetary policy in an era of climate change.

[35] Schnabel (2023).

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ANNEX

Empirical Methodology

Beirne et al. (2023) use a panel structural vector autoregression (PSVAR) model to estimate the average monthly response of headline inflation and its main sub-indices to shocks imposed on the natural disaster variable. The model can be denoted as follows, with structural shocks identified by a recursive restriction:

$$Y_{i,t} = A(L)Y_{i,t-1} + \alpha_i + \mu_{i,t},$$

where the variable $Y_{i,t}$ refers to the vector of endogenous variables of country *i* at month *t*. These include the estimated monetary damages caused by natural disasters, a measure of inflation, and other domestic drivers of inflation. $A(L)$ is a matrix of polynomials in the lag operator L while α_i denotes country-specific fixed effects to account for unobserved time-invariant heterogeneity across countries and $\mu_{i,t}$ is a vector of idiosyncratic disturbances. Note that the exogenous nature of the disaster variable allows the authors to employ a recursive identification scheme.

Due to the autoregressive nature of the PSVAR, fixed effects are intrinsically correlated with the regressors. A forward orthogonal deviation procedure proposed by Arellano and Bover (1995) is used to eliminate fixed effects, such that the transformed variables are orthogonal to the lagged regressors. Three lags are included in the PSVAR model, as suggested by the Akaike information criterion.

Following Christiano et al. (1999), the identification strategy is based on a block recursive restriction, which results in the following matrix *A* to fit a just-identified model:

$$A_{m,n} = \begin{pmatrix} a_{1,1} & 0 & \cdots & 0 \\ a_{2,1} & a_{2,2} & \ddots & \vdots \\ \vdots & \vdots & \ddots & 0 \\ a_{m,1} & a_{m,2} & \cdots & a_{m,n} \end{pmatrix}$$

The ordering of the variables imposed in the recursive form implies that the variables at the top will not be affected by the contemporaneous shocks to the lower variables, while the lower variables will be affected by the contemporaneous shocks to the upper variables. The disaster variable is placed at the top of the ordering, which implies that it will only be affected by a contemporaneous shock to itself. Following the disaster variable, the authors place industrial production, the unemployment rate, monthly changes in the US dollar nominal exchange rate, import prices, and oil prices next in the ordering. This implies that these domestic factors will be affected by contemporaneous shocks to natural disasters and themselves, but not by contemporaneous shocks to inflation. Importantly, inflation comes last in the ordering, which assumes that both natural disasters and domestic macroeconomic factors will affect inflation.

Rising inflation complicates the alignment of the ECB's policies with the Paris Agreement. This paper provides novel evidence for inflationary pressures arising from natural disasters. We then discuss the effectiveness of monetary instruments to boost a green transition, concluding that the scope of policy measures used thus far is limited. As additional measures, we advise active rebalancing of the ECB's bond holdings towards greener issuers, enforcing stricter disclosure standards, and differentiating lending facilities in favour of green investments.

This document was provided by the Economic Governance and EMU Scrutiny Unit at the request of the Committee on Economic and Monetary Affairs (ECON) ahead of the Monetary Dialogue with the ECB President on 27 November 2023.

PE 755.708
IP/A/ IP/A/ECONMD/FWC/2020-002/C5/SC14

Print ISBN 978-92-848-1256-1 | doi:10.2861/ 949567 | QA- 09-23-516-EN-C
PDF ISBN 978-92-848-1257-8 | doi:10.2861/ 494418 | QA- 09-23-516-EN-N