MONETARY POLICY OPERATIONS AND BIODIVERSITY LOSS

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INTRODUCTION

“Biodiversity is declining at unprecedented rates in human history, with growing evidence that this could have significant economic and financial implications” (NGFS and INSPIRE 2021). In this regard, biodiversity loss is very similar to climate change: both entail physical risks that could translate into substantial economic and financial losses, and mitigating them requires profound economic transformations, with important transition risks. Furthermore, the economic and financial risks associated with biodiversity loss are, like for climate change, far-reaching, foreseeable, and potentially irreversible. Finally, the magnitude of the future impact of biodiversity loss and climate change crucially depends on the actions taken by policy makers today.

Central banks have extensively studied the challenges that climate change poses to them. They have highlighted its impact on key macroeconomic variables for them, like economic growth and price stability (see, e.g., NGFS 2020). They have also underlined its potential threat to financial stability (see, e.g., ESRB 2020 and FSB 2020). Against this background, central banks have thoroughly reviewed the consequences of climate change for monetary policy operations, as well as how to adjust them to meet the challenges posed by climate change (NGFS 2021). Such a review is lacking for biodiversity loss.

This note contributes to filling this gap. It builds on the experience central banks have accumulated on the links between monetary policy operations and climate change and draws some parallels for the case of biodiversity loss. It also highlights key differences between the two and suggests measures that central banks should take to adjust their monetary policy operations to the economic and financial challenges posed by biodiversity loss.

The policy recommendations from this analysis are the following:

1) Central banks should assess the extent to which assets and counterparties eligible for monetary policy operations are exposed to biodiversity-related financial risks, as well as the extent to which they have impacts on biodiversity loss.

2) Central banks should focus on economic activities, firms, regions, or types of biodiversity risks for which the exposure to biodiversity-related financial risks is the most obvious and those for which the impact on biodiversity loss is most evident.

3) Central banks should implement measures in their monetary policy operations to protect their balance sheet from biodiversity-related financial risks, as well as to decrease their impact on biodiversity loss.

4) Central banks should act on the available data even if uncomplete and unprecise, to avoid the potentially large and irreversible economic and financial costs resulting from biodiversity loss.
MONETARY POLICY OPERATIONS AND BIODIVERSITY LOSS: THE TRANSMISSION CHANNELS

Central banks implement monetary policy through monetary policy operations. These operations rely extensively on financial institutions and financial markets. They involve financial assets and counterparties that are exposed to biodiversity-related financial risks and have an impact on biodiversity through the funding they provide to economic activities that contribute to biodiversity loss or preservation. This section highlights the channels through which monetary policy operations both expose central banks to biodiversity-related financial risks and impact biodiversity.

Monetary policy operations: an overview

Central banks implement monetary policy mainly through two types of operations: credit operations and asset purchases.

Credit operations

Central banks supply financial institutions with liquidity through loans in central bank money. They calibrate the price and the volume of these loans to influence general credit conditions in the economy and set them at the levels they need to achieve their policy objectives. Central banks traditionally rely on short term loans in credit operations, but since the 2008 financial crisis, they have increasingly resorted to long term loans and to targeted operations. The latter aim at stimulating specific segments of the economy by providing funding to banks at favourable conditions when they lend to these segments. Credit operations are backed by collateral in the form of financial assets posted to the central bank by the financial institutions taking a loan. Central banks usually apply haircuts to this collateral, i.e., a reduction in the value of the collateral against which loans can be taken.

Asset purchases

Central banks also resort to outright asset purchases to implement monetary policy. They buy both domestic and foreign assets, depending on their monetary policy strategy. Domestic assets purchases – i.e. quantitative easing – are used to ease monetary conditions on domestic markets. Domestic purchases have become a key instrument for central banks since the 2008 financial crisis. Central banks usually purchase both private and sovereign domestic bonds, and sometimes other domestic private asset-backed securities. Foreign asset purchases are used by central banks that implement an exchange rate policy. These assets – or foreign exchange reserves – usually include both private and sovereign foreign assets.

Both credit operations and asset purchases expose central banks to biodiversity-related financial risks. They also both have an indirect impact on biodiversity loss or conservation.

Exposure to biodiversity risk through monetary policy operations

Like climate risks (BCBS 2021), biodiversity risks materialize within traditional risk categories: credit risk, market risk, liquidity risk, operational risk, and reputational risk. Central banks are directly exposed to these risks through the assets they own. They are also indirectly exposed to them through the exposure of the financial institutions they lend to in credit
operations. Both direct and indirect exposures ultimately depend on the exposure to biodiversity-related risks of the firms and households issuing the assets owned by central banks' balance sheet and by their counterparties in credit operations.

Biodiversity-related shocks, like climate-related shocks (NGFS 2021), can generate financial losses for central banks. These losses can materialize through a fall in the price of the assets they hold and through a default of their issuers. Losses can also result from the defaults of financial institutions that are central banks' counterparties in credit operations. Central banks have thus an interest in ensuring that their counterparties are not exposed to significant financial risks, including biodiversity-related financial risks. Central bank losses are also a function of the value of the collateral they hold from credit operations if counterparties default. This value can fall following biodiversity-related financial shocks.

**Impact of monetary policy operations on biodiversity**

Monetary policy operations are not without consequences on biodiversity. When an asset is bought by central banks or accepted by them as collateral, its price increases. This gives an incentive for financial institutions to issue such assets in larger quantities and to provide funding to the corresponding firms at a lower price. Similarly, the conditions that central banks set to access their credit operations can impact the distribution of credit in the economy, and thus which firms get bank funding. Targeted credit operations, for example, are intended to channel bank loans toward specific segments of the economy.¹

By choosing which assets they purchase, which ones they accept as collateral and which loans give access to targeted credit operations, central banks also select which economic activities they indirectly support with better funding conditions. This can translate into indirectly supporting economic activities that are detrimental to biodiversity and thus exacerbate biodiversity loss.² It can however also potentially support economic activities that maintain or restore biodiversity.

**TAKING BIODIVERSITY CONSIDERATIONS INTO MONETARY POLICY OPERATIONS: THE RATIONALES**

There are four key motives for central banks to reduce both their exposure to biodiversity-related financial risks and their impact on biodiversity loss: keeping financial risks in their balance sheet in check, strengthening financial stability, supporting economic stability, and contributing to general policy objectives.

**Managing balance sheet risk exposure**

Monitoring financial risks in their balance sheets and keeping them under control is a core task of central banks. A sound implementation of monetary policy, both through asset purchases and through credit operations, requires a comprehensive and conservative

² Kedward et al. (2021), for example, find that over 70% of the European Central Bank (ECB) corporate bond portfolio is potentially associated with high or very high negative impacts upon nature.
consideration of all risks, including climate- and biodiversity-related financial risks. Keeping balance sheet risks in check and low is key for central bank credibility and for protecting public funds and, ultimately, the value of a currency. As Jens Weidmann, former President of the Deutsche Bundesbank, put it in the context of climate-related financial risks: “We owe it to European taxpayers to keep the financial risks that arise from our monetary policy operations in check.” This view is shared by NGFS members, which recommend central banks to “at the very least, [...] carefully assess, and where appropriate adopt, additional risk management measures to protect their balance sheets against the financial risks brought about by climate change” (NGFS 2021). This holds true for biodiversity-related financial risks too.

There is currently a broad agreement among financial supervisors that climate risks are not fully priced in by financial markets. It is very likely the same for biodiversity risks since they face the same market failures as climate risks (lack of data, limitations in risk assessment methodologies, short-termism of financial markets). This potentially exposes central banks to large unaccounted risks in their balance sheets, if they do not take measures to account for such mispricing. These unaccounted risks directly affect the assets they own from asset purchases, and indirectly the loans they give to financial institutions in credit operations – through the exposure of their counterparties to these unaccounted risks.

Against this background, to duly account for biodiversity-related financial risks, central banks must reduce their direct exposure by moving their asset portfolio and pledged collateral away from assets exposed to significant biodiversity-related financial risks and toward safer assets. They must also ensure that their counterparties do the same to reduce their own exposure and thus reduce the central bank’s indirect exposure through counterparty risk.

**Strengthening financial stability**

Biodiversity loss and its economic consequences are a serious source of risk for the financial system. In the case of climate risks, financial supervisors have shown that the transition to a climate-neutral economy is clearly the safest scenario for the financial system. Without a transition, financial instability increases significantly (ESRB 2021). This is very likely to be also the case with biodiversity loss: a transition to a biodiversity-neutral economy is probably the best scenario to avoid financial instability resulting from biodiversity-related shocks.

Central banks have a financial stability mandate. They thus have the duty to use the tools they have to support this transition, and thus provide the best conditions for financial stability. Monetary policy operations are part of this toolkit. Central banks have used them repeatedly to safeguard financial stability in the past – e.g., during the 2007-2008 financial crisis. By reducing their impact on biodiversity loss through monetary policy operations, central banks support this transition, and thus indirectly fulfil their stability financial mandate. Furthermore, by doing so they set financial incentives for financial institutions to also move in this direction, and thus reinforce financial stability further.4

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4 Greater financial stability is also beneficial for central banks from a balance sheet risk management perspective: it decreases the counterparty default risk that central banks are exposed to through credit operations.
Supporting economic stability

Most central banks have objectives related to economic stability or sustained growth in their mandate. Biodiversity loss has significant economic repercussions that are very likely to be a source of economic instability and to reduce growth. As for financial stability, a transition to a biodiversity-neutral economy is the best-case scenario to guarantee a stable economic environment. Using monetary policy operations to support the transition, and thus economic stability, is therefore part of central bank mandates to safeguard economic stability and sustained growth.

Contributing to sustainability goals

Some central banks have a mandate to support broader governmental policies in general, including those with environmental goals (Dikau and Volz 2021). The ECB is a case in point: its mandate specifies that, without prejudice to its primary objective of price stability, the ECB must support the general objectives of the European Union, which include environmental sustainability. In this context, and to the extent biodiversity objectives are part of government policy, mitigating the impact on biodiversity loss through monetary policy operations, is part of such mandates.

INTEGRATING BIODIVERSITY CONSIDERATIONS INTO MONETARY POLICY OPERATIONS: IMPLEMENTATION

The reflexions on integrating climate change considerations into monetary policy operations have highlighted three key questions for central banks:

1) should they use proactive approaches, with the aim to support the transition, or protective measures, aimed at mitigating risk in their balance sheet, or both?
2) what are the concrete policy options they have to implement proactive and protective measures?
3) how should central banks deal with incomplete and imprecise data to calibrate their policies?

These questions are also key in the context of integrating biodiversity considerations into monetary policy operations. The insights acquired from climate change allow us to give some early answers for biodiversity, and to stress specificities in this particular context.

Balancing proactive and protective policies

In the context of climate change, most central banks agree on the necessity to implement protective measures – i.e., measures that reduce central bank balance sheet exposure to climate-related financial risks (NGFS 2021). This should also apply for biodiversity-related financial risks. However, to best protect their balance sheets from biodiversity-related risks, central banks should also consider proactive measures – i.e., measures that decrease the impact of monetary policy operations on biodiversity loss. Indeed, by supporting the transition, such measures reduce biodiversity-related financial risks in general, and, more specifically, in financial markets. This indirectly decreases biodiversity-related financial risks
in the assets owned by central banks, as well as in their counterparties for credit operations. They thus give central bank balance sheet greater protection over the medium term against biodiversity-related risks. In that sense, proactive measures can also be considered as protective for central bank balance sheets. Proactive measures are thus in-line with sound balance sheet risk management, as well as with the objectives in central bank mandates (price stability, financial stability, economic stability, sustained growth, and, for some central banks, contribution to sustainability goals). Against this background, central banks should implement both proactive and protective measures.

However, sometimes, proactive and protective approaches have conflicting effects – i.e., purchasing assets that support nascent biodiversity restoration technologies might have a big impact on mitigating biodiversity loss but might also be financially risky. In that case, a clear and balanced evaluation of both the potential impact on biodiversity and the financial risk is necessary. In this evaluation, medium-term risk considerations, including the positive impact of proactive measures on fostering financial and economic stability and thus on decreasing financial risks, might prevail over short-term financial risk management considerations. Central banks should in any case implement proactive and protective measures that complement each other. In that case, they should begin implementing them immediately, while evaluating the trade-offs of conflicting measures.

To identify reinforcing or conflicting measures, central banks must have a clear view on the impact of their assets and of their counterparties in credit operations on biodiversity loss, as well as on their biodiversity-related financial risks exposure. For that, central banks need a minimal level of information on the impact of asset issuers and of counterparty financial institutions on biodiversity, as well as on their exposure to biodiversity-related financial risks. The ideal dashboard to conduct monetary policy operations should provide such indicators at a sufficiently granular level and with reasonable uncertainty around them (Braunschweig, Colesanti Senni and Lunsford 2022).

Assessing options to integrate biodiversity considerations

Central banks have extensively analysed the proactive and protective monetary policy operation options available to them in the context of climate change (NGFS 2021). All options considered are based on adjusting eligibility criteria for the assets involved in monetary policy operations (i.e., purchased, accepted as collateral and eligible for refinancing operations), as well as on adjusting the conditions at which counterparties can access monetary policy operations through these assets. The policy options for integrating biodiversity considerations into monetary policy operations rely on the same principles.

The NGFS summarizes the different options in the climate change context in the table below (NGFS 2021).

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5 See previous section.
These options are assessed along four criteria: their consequences for monetary policy effectiveness, their contributions to mitigating climate change, their effectiveness as risk protection measures and their operational feasibility. The contribution of these options to mitigating biodiversity loss is likely to be the same as for climate change since they rely on the same financial incentive mechanisms. Using biodiversity considerations instead of climate change considerations is not likely to drastically change the impact of the different options on monetary policy effectiveness or on their effectiveness as risk protection measures. Given the imperfect information in the biodiversity data that is currently available, all options are difficult to implement with precision, probably more than for climate change.

Three options stand out as both potentially strongly mitigating biodiversity loss and being effective as a protection measure, as well as without negative consequences for monetary policy effectiveness. The first option is to adjust rates in credit operations to reflect biodiversity considerations in the lending benchmark (column 1). Such policies – i.e., supporting some specific economic segments through credit operations at lower interest rates – are already implemented in many central banks in the form of targeted refinancing operations (TROs), but for other policy objectives than biodiversity conservation or biodiversity loss mitigation (Colesanti Senni and Monnin 2021). Central banks have experience in using them and generally consider that they achieve their objectives. Including biodiversity considerations into existing targeted refinancing operations and implementing them seems a good point to start for central banks.

The two other options are to align collateral policy and asset purchases on benchmarks that reflect biodiversity considerations (columns 7 and 8). Such benchmarks should integrate protection concerns – i.e. by decreasing portfolio exposure to biodiversity-related financial risk – but also proactive features to more actively support the transition – i.e., by moving away from economic activities aggravating biodiversity loss toward biodiversity-neutral economic activities.
Reflecting biodiversity-related financial risks in collateral haircuts is also a measure that protects central bank balance sheets and including proactive considerations in them would contribute to mitigating biodiversity loss (column 4). Note that negative screenings in collateral and asset purchases – i.e., excluding assets contributing to biodiversity loss from eligible collateral and purchased assets – are also measures contributing to mitigate biodiversity losses and protecting central bank balance sheet. They could however reduce the effectiveness of monetary policy transmission if the remaining pool of assets eligible for collateral or bought by the central bank is not large enough to pass monetary policy operations through to financial markets. This can be avoided by calibrating the exclusion criteria adequately.

Finally, although adjusting counterparties’ eligibility for credit operations can entail strong consequences for monetary policy, this option should still be considered because its impact on mitigating biodiversity loss is likely to be substantial and its effectiveness as a protective measure might be underestimated in the NGFS analysis (column 3). Indeed, excluding counterparties that are highly exposed to biodiversity-related financial risks is a strong protective measure for central banks against counterparty default risk. Furthermore, the threat of being excluded from central bank credit operations is a strong incentive for financial institutions to carefully manage their exposure to biodiversity risk. This measure is thus likely to enhance biodiversity risk management at the financial system level.

**Dealing with incomplete and imprecise data**

Even more than for climate change, data on biodiversity are incomplete and imprecise. They can however already be used, to some extent, to implement initial monetary policy operations measures. A first step for central banks is to assess which assets in their balance sheet rely on economic activities that are exposed to biodiversity risks, and which ones generate biodiversity loss. With this information, central banks would have minimal but essential knowledge to start adjusting monetary policy operations to reduce their exposure to biodiversity-related risk and their impact on biodiversity loss, respectively. Tools already exist for a first estimation of both (see Kedward et al. 2021, Svartzman et al. 2021).

Given the lack and impreciseness of biodiversity data, central banks must begin adjusting progressively their monetary policy operations, starting by decreasing their exposure to the most obvious risks and reallocating their portfolio away from the most obvious high-impact economic activities. In the context of climate change, Fahlenbrach and Jondeau (2021), and Dafermos et al. (2020a, 2020b) have shown that central banks can reduce their exposure to economic activities that are exposed to climate risk and have a negative impact on climate change, without impeding on the transmission of monetary policy. In the case of biodiversity loss, obvious risks and impacts could be limited to some specific sectors, firms, regions or types of biodiversity risks. Central banks should start with targeted measures for these specific dimensions and not wait to have a full vision of the economy and the biodiversity risks before acting.

Given that the estimation of biodiversity risk is subject to radical uncertainty (Kedward et al. 2020), central banks should use a “precautionary principle” when estimating biodiversity-related risks – i.e., they should rely on estimates in the higher range of the estimated risk distribution and act on available data even if imprecise and incomplete. In the context of climate risk management by financial institutions, Andrew Bailey, Governor of the Bank of England, insisted that “uncertainty and lack of data is not an excuse. […] We expect firms to
make reasonable judgements rather than default to ‘zero’. This requirement is also applicable to central banks’ risk management in the context of biodiversity risk.

Finally, as Frank Elderson, member of the ECB Executive Board and vice-chair of the ECB Supervisory Board, stresses: “No, climate data are not harmonised yet. And yes, they are patchy and incomplete. But as imperfect a measure as they may be, they will allow us to make progress.” And so are biodiversity data. Given the urgency of the situation for biodiversity, and the potentially irreversible economic and financial consequences of biodiversity loss, central banks cannot wait for the perfect data to start acting. Some data, combined with the available scientific knowledge on the links between biodiversity loss and some economic activities are robust enough to serve as basis for targeted policy decisions in the context of monetary policy operations.

CONCLUSION AND POLICY RECOMMENDATIONS

Monetary policy operations expose central banks to biodiversity-related financial risks through the assets they purchase and accept as collateral and through the exposure of their counterparties in credit operations. At the same time, central banks have an impact on biodiversity loss through these same assets and thought the conditions they set for credit operations. By adjusting their asset purchases, their collateral framework and their credit operations, central banks can decrease both their exposure to biodiversity-related financial risks and their impact on biodiversity loss.

To take appropriate decisions on how to adjust monetary policy operations to biodiversity considerations, central banks must first know which assets and counterparties expose them to biodiversity-related financial risks and which assets and counterparties contribute to biodiversity losses. Tools to get this first assessment already exist.

Given the incomplete and imprecise nature of biodiversity data, central banks should focus first on sectors, firms, regions, or types of biodiversity risks for which exposure to biodiversity-related financial risks is most obvious and for which the impact on biodiversity loss is most evident. Central banks should implement targeted monetary policy operations to decrease the obvious biodiversity-related financial risk exposures and the evident impact on biodiversity loss. They should do so now and not wait to have an overall view of all sectors and firms in the economy, or of all biodiversity risks.

Central banks have an interest in supporting the transition to a biodiversity-neutral economy. In this scenario, economic and financial instability are significantly lower than if biodiversity continues to degrade. Proactive measures that decrease monetary policy operations’ impact on biodiversity loss are thus an integral part of sound balance sheet risk management and critical for central banks to pursue their stability mandate. Thus, alongside measures that protect their balance sheet from biodiversity-related financial risks, central

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6 Andrew Bailey, The time to push ahead on tackling climate change, speech at the Corporation of London Green Horizon Summit, Mansion House, 9 November 2020.

7 Frank Elderson, Patchy data is a good start: from Kuznets and Clark to supervisors and climate, speech at the ECB-EBRD joint conference on “Emerging climate-related risk supervision and implications for financial institutions”, 16 June 2021.
Bank must also implement proactive measures that decrease their impact on biodiversity loss to support economic and financial stability in the medium-term.

Finally, given the urgency of the situation, and the potentially large and irreversible economic and financial costs of biodiversity loss, central banks should act on the available data even if incomplete and imprecise, relying on a precautionary principle. As the NGFS clearly stated with regard to climate change: “when balancing the need for robust and comprehensive data against the opportunity cost of inaction, central banks should be cognisant of the risk that acting early with imperfect information could be less costly than acting only once stronger data standards have emerged.” (NGFS 2021) The same applies to biodiversity loss.

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