Is Nature Risk Macro-Critical for Japan's Economy and Financial System?

Elena Almeida[*], Simon Dikau* and Ulrich Volz[†]*

Summary

Japan's economy, as well as lives and culture, are supported by ecosystem services provided by biodiversity. However, many of the ecosystem services in Japan have been declining for years (MoE, 2016). For example, domestic provisioning services, such as certain agricultural crops, seafood and timber products are diminishing. Economic activity and firms contribute to the decline of nature and ecosystem services in Japan and impact the deterioration of resources through habitat destruction or overuse. At the same time, economic activity and firms' operations are dependent on ecosystem services such as freshwater production. In turn, the Japanese banking system finances and is thereby exposed to the loss of ecosystem services that, given the urgent and structural transformations needed to deliver a biodiversity- and nature-positive economy, could come with significant risks and potentially macro-critical challenges. This paper explores the impact and dependencies of the Japanese economy and banking sector on key ecosystem services, utilising the ENCORE methodology. The paper is the first to do so, providing a first indication of the macro-criticality of nature loss in Japan and highlighting potential policy implications.

Extended abstract

More than half of global GDP depends on nature and its services (World Economic Forum, 2019). It is now increasingly understood that environmental degradation negatively impacts society, the economy and the financial system. The Earth has surpassed six of nine planetary boundaries, indicating that it is critically approaching irreversible Earth System tipping points (Richardson et al 2023). Meanwhile, the Intergovernmental Panel of Biodiversity and Ecosystem Services (IPBES) assessed that 14 out of 18 ecosystem services have declined since 1970s (IPBES, 2019). Recent landmark agreements such as the Global Biodiversity Framework and the Biodiversity Beyond National Jurisdiction treaty demonstrates the rising global commitment in tackling environmental degradation.

Central banks and financial supervisors are beginning to understand and acknowledge that the degradation of nature has direct implications for economies and financial systems (NGFS, 2021a; 2021b, 2022). First, economic activity and financial assets are dependent upon the ecosystem services provided by biodiversity and the environment: this raises the prospect of physical risks to finance if these services are undermined. Second, economic activity and financial assets in turn have impacts on biodiversity and could therefore face risks from the transition to a nature-positive global economy.

Over the past three years, central banks around the world have started to map out financial sector exposures to nature degradation, e.g., DNB (2020), BdF (2021), BCB (2021), BNM (2022), Banxico (2023), ECB (2023) and BSP (2023). Since then, new methodologies have emerged in extending these nature exposure analyses into risk assessments (Ranger et al., 2023). On the global level, the findings of the NGFS-INSPIRE Study Group (Almeida et al., 2022), and the acknowledgement by the NGFS (NGFS, 2021a) that nature-related risks could have significant macroeconomic implications prompted the establishment of the NGFS Nature Task Force. This year, the Task Force published a Conceptual Framework, outlining in greater detail how the failure to account for these broader environmental risks, mitigate, and adapt to these implications is a source of risks relevant for financial stability (NGFS, 2023).

[*] London School of Economics and Political Science
[†] SOAS University of London

Biodiversity loss and the decline of ecosystems create new risks for the economy and financial system, but they also compound climate risks (Almeida et al., 2022). In current discussion, nature tends to be explained as being more complex than climate, but science does not distinguish between different Earth System functions – they are all connected (Richardson et al 2023). A recent NGFS study demonstrates that nature-risks can be even more immediate than climate risks, even amplifying climate risks, necessitating appropriate measurement, management and pricing of these risks (Ranger, 2023). By ignoring the important role of nature and its interactions, there is a risk that central banks, supervisors, financial institutions and other policymakers are significantly underestimating climate risks in current frameworks.

In the context of the Japanese economy, which depends heavily on key ecosystem services, including those related to forests (e.g.: water storage, landslide prevention, biodiversity conservation, mitigation of climate change and timber production) and wetlands (e.g.: adjusting climate change, water control, water purification, ecosystem and biodiversity and recreation) (Hayashi & Sato, 2016). Apart from direct impacts and dependencies, Japan also has an exceptionally high dependence on imported food and resources, which is not only affecting nature and ecosystem services in other countries but may also be a contributing factor to further transportation-related emissions.

While physical risks arise from changes in weather, climate, biodiversity and the degradation of ecosystem services that impact economies, transition risks arise from changes in expectations as a result of a transition to a low-carbon and/or nature-positive economy. In this context, Japan has committed to the "30 by 30" target adopted at the UN Biodiversity Conference (COP15) in Montreal, Canada in December last year. The pledge to conserve at least 30% of both land and sea areas by 2030 is one of the flagship initiatives agreed at COP15 under the Kunming-Montreal Global Biodiversity Framework. In this context, Japan is stepping up, with Minister of the Environment NISHIMURA Akihiro announcing 117 billion yen (approximately $890 million) in funding for conservation from 2023 to 2025, a $638 million contribution to the Global Environment Facility, and $17 million for the Japan Biodiversity Fund (Reuters, 2023).

The paper first reviews the key characteristics and aspects of the Japanese economy, its trade links and its embeddedness in nature in the context of its special geography and exposure to natural disasters with cascading impacts across the economy (e.g.: earthquakes and implications to ecosystem services). In this context, the paper also identifies the key ecosystem services, their location and state. It also reviews factors on the transition risk side such as relevant environmental laws and target ambitions in Japan. Second, following Svartzman et al. (2022) and Van Toor et al. (2020), the paper utilises the Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) approach to visualise how the Japanese economy potentially depends on and impacts nature and how environmental change creates risks for businesses. Third, the paper explores the financial implications for the Japanese banking system. It illustrates how the financial sector is exposed to physical risks from biodiversity loss and examines the extent to which the Japanese financial sector is exposed to ecosystem services indirectly, through the activities of the firms it finances. To this end, it applies the ENCORE to financial institutions' holdings of loans, shares and bonds. Fourth, the paper provides a first indication on the exposure of the financial sector to transition risk through a literature review and in the context of financial institutions' financing of activities in biodiversity hotspots. Financial institutions will face transition risks should governments seek to protect these areas, reducing or halting impactful economic activities. Finally, the paper offers and discusses potential policy implications relating to the economic as well financial impact and dependencies.

References:

Hayashai, T. and Sato, M (2016). Ecosystem service valuation and ecosystem asset account in Japan.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [IPBES] (2019) Global assessment report on biodiversity and ecosystem services. Bonn: IPBES.

Network for Greening the Financial System [NGFS] and the International Network for Sustainable Financial Policy Insights Research and Exchange [INSPIRE] (2021a). Biodiversity and financial stability – exploring the case for action. Network for Greening the Financial System [NGFS] and International Network for Sustainable Financial Policy Insights Research and Exchange [INSPIRE] (2021b). Biodiversity and financial stability – building the case for action.

Almeida E, Dikau S, Le Calvar E, Jun M, Kunesch N, Nicholls M, Nick Robins, Salin M, Sun T and Svartzman R (2022). Central banking in the biosphere: Biodiversity loss, financial risk and system stability – An agenda for action, Study Group Final Report. NGFS Occasional Paper. NGFS, INSPIRE and Banque de France, Paris

Ministry of Finance [MoF] (2016) Japan Biodiversity Outlook 2. Report of Comprehensive Assessment of Biodiversity and Ecosystem Services in Japan

Ranger, N., Alvarez J., Freeman, A., Harwood, T., Obersteiner, M., Paulus, E. and Sabuco, J. (2023). The Green Scorpion: the Macro-Criticality of Nature for Finance – Foundations for scenario-based analysis of complex and cascading risks physical nature-related risks. Oxford: Environmental Change Institute, University of Oxford.

Reuters (2023). Japan's broad alliance for biodiversity.

Katherine Richardson et al. ,Earth beyond six of nine planetary boundaries.Sci. Adv.9,eadh2458(2023).DOI:10.1126/sciadv.adh2458

Svartzman, R., Espagne, E., Gauthey, J., Hadji-Lazaro, P., Salin, M., et al. (2021). A 'Silent Spring' for the financial system? Exploring biodiversity-related financial risks in France. Banque de France Working Paper no. 826.

Van Toor, J., Piljic, D., Schellekens, G., van Oorschot, M., and Kok, M. (2020). Indebted to nature. Exploring biodiversity risks for the Dutch financial sector. Amsterdam: De Nederlandsche Bank; Planbureau voor de Leefomgeving.

World Economic Forum (2021) What is 'nature positive' and why is it the key to our future? Blog post, 23 June. https://www.weforum.org/ agenda/2021/06/what-is-nature-positive-and-why-is-it-the-key-to-our-future/