Assessing Nature-Related Financial Risks: The Case of Lithuania

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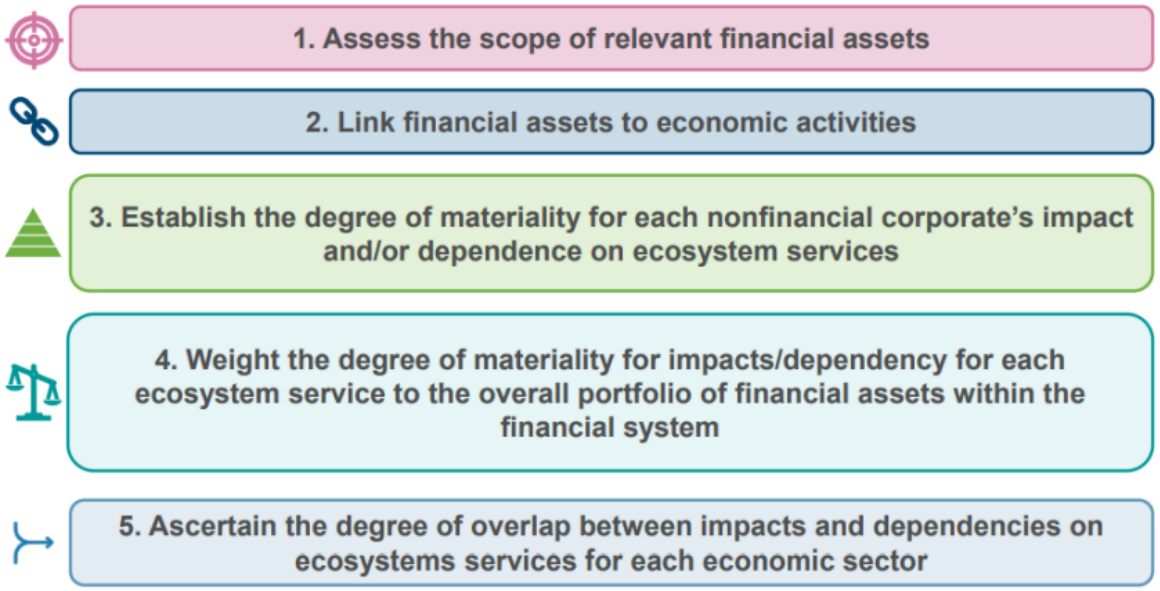
Motivation

- Over half of global gross domestic product (GDP) is highly or moderately dependent on nature and ecosystem services
- **Nature-related risks can be transmitted to the financial system via the real economy**, with the potential to trigger financial instability
- **The impacts from the loss of ecosystem services are not uniform** across geographic regions and different income levels
- **To assess and mitigate the potential impact of ecosystem service loss on financial stability, it is crucial to identify and measure nature-related financial risks locally.**

Methodology



Source: OECD, 2023, A supervisory framework for assessing nature-related financial risks: Identifying and navigating biodiversity risks, OECD Business and Finance Policy Papers.

We follow the approaches of similar studies by using the ENCORE framework, with the main assumption being that the level of ecosystem service dependency of each financial institution can be approximated by examining all the companies (or sectors) the financial institution has on its balance sheet and calculating the combined dependencies of all these companies (or sectors) on ecosystem services.

Data and Methodology

- Lithuanian banks' commercial loan portfolio information (loan amount outstanding as of April 1, 2023, per NACE economic sector per bank) was collected using the supervisory financial reporting (FINREP) framework.
- We use ENCORE for information on a business process dependencies on ecosystem services.
- ENCORE uses the GICS classification. Therefore, to link bank lending data to the ENCORE framework, GICS business process were manually re-mapped to match the NACE nomenclature .
- In assessing the dependency of the commercial banks on the ecosystem services, two assumptions were made:
    - First, for each sector the banks lend to, all production processes are represented proportionally.
    - Second, each production process depends proportionally on each ecosystem service defined by the ENCORE database.

Data and Methodology

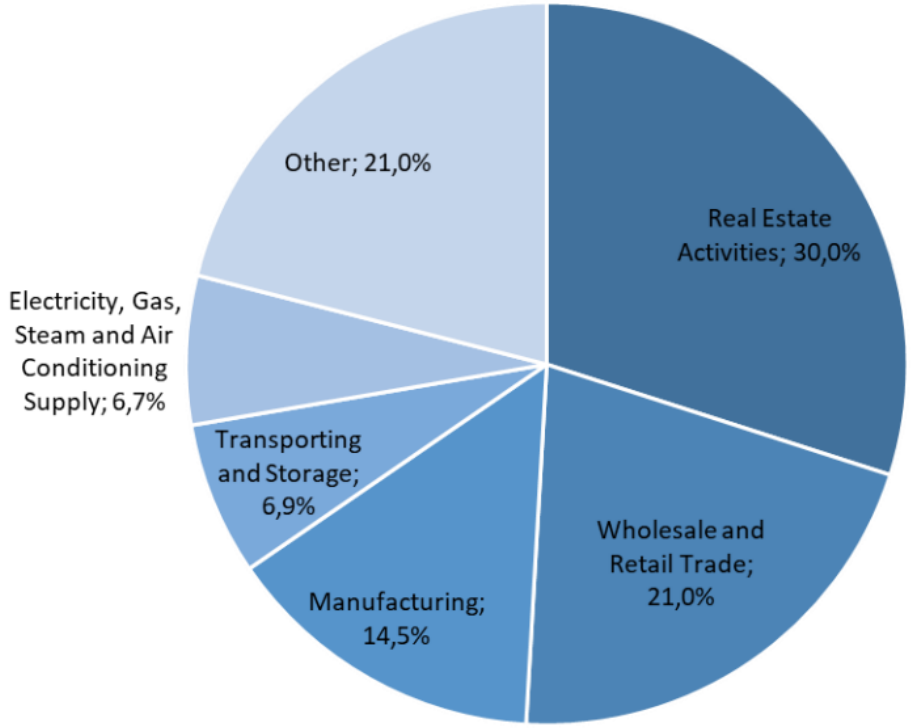
- Before computing the dependency of the financial institution on ecosystem services, **we assess the ecosystem-dependency score of each activity sector the financial institution lends to.**
- **To compute a dependency score for each bank** (or for the entire banking sector, in which case there is no subscript b denoting each bank) on each ecosystem service, **we calculate a weighted mean** as follows:

$$DS_b^e = \sum_s^n DS_s^e \times \frac{loan\ amount_b^s}{Total\ loan\ amount_b}$$

- **We also aggregate business lending according to the borrower's degree of dependence on ecosystem services as an alternative.** We focus only on "very high", "high", and "medium" dependencies defined by the ENCORE methodology. In this way, **we obtain the share of bank's loans that are exposed to ecosystem services at different levels of ecosystem dependence.**

Lithuanian Banks Commercial Lending

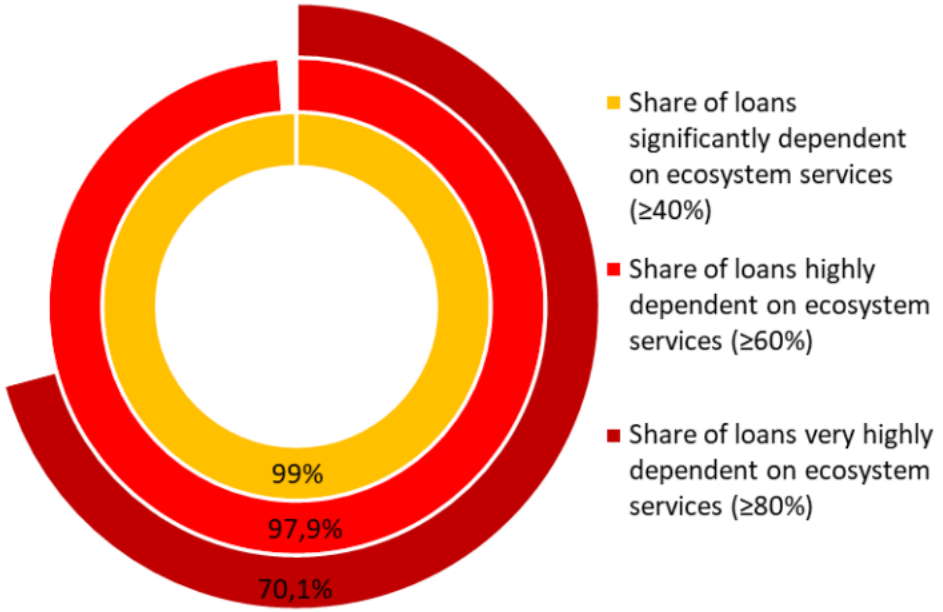
Sectoral Composition of Bank Commercial Lending in Lithuania



Source: Bank of Lithuania FINREP data.

Notes: Aggregate commercial loan portfolio composition as of April 1, 2023

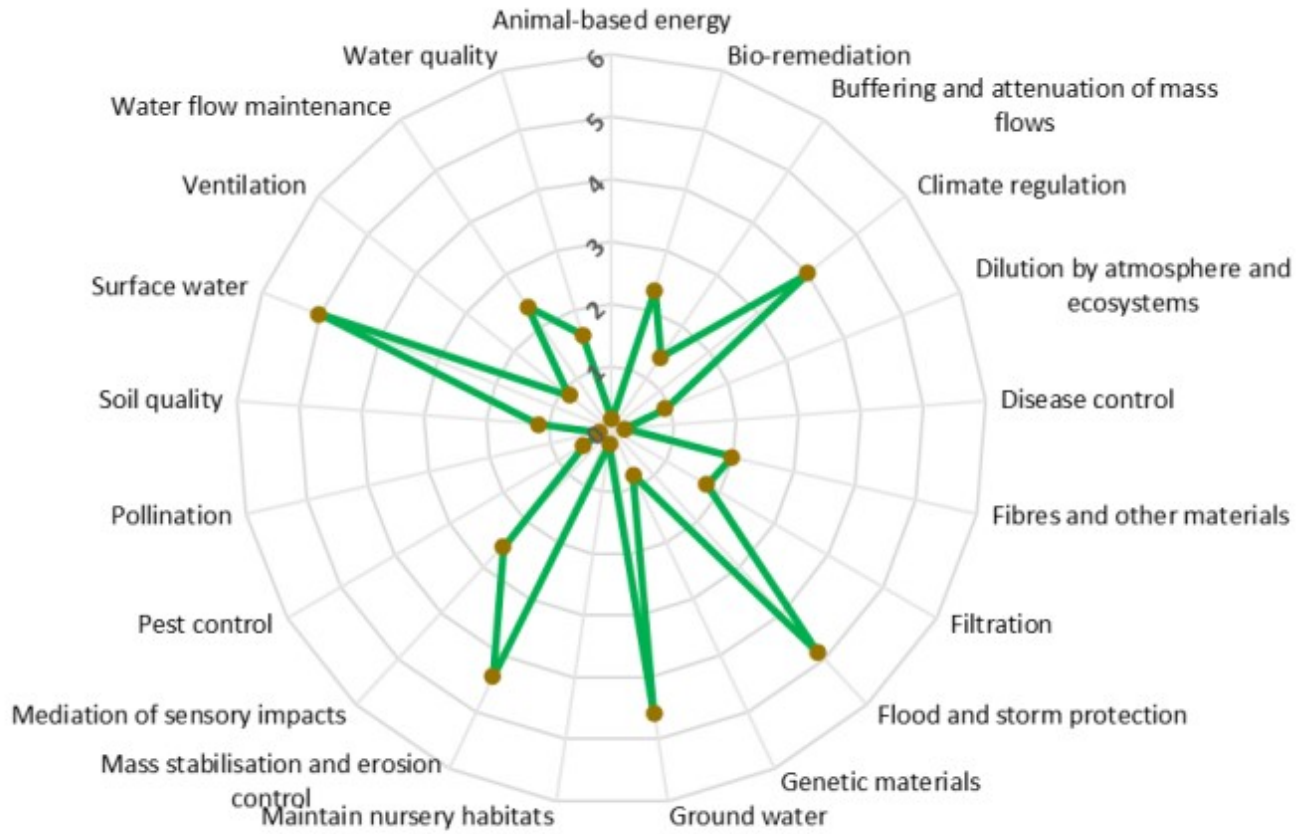
Exposure of Lithuania's Banks' Loan Portfolios to Ecosystem Services



Sources: Bank of Lithuania and ENCORE data; own calculations.

Note: Share of loans at selected dependency score for at least one ecosystem service. A loan is labelled as highly dependent when the borrowing company has a sufficiently high direct dependency score to at least one ecosystem service. Aggregated commercial loan information to the banking sector level is used.

Ecosystem Services Dependence



Sources: Bank of Lithuania and ENCORE data; own calculations.

Note: Dependence is measured in levels 1 to 10, where 10 would be an assigned dependence level of a firm whose business is solely extraction and sale of ground water to a ground water ecosystem service. Aggregated commercial loan information to the banking sector level is used.

When it comes to risks arising from dependencies on ecosystem services, it is important to remember that **dependency cannot be equated with risk**.

To accurately assess the magnitude of financial risks associated with the dependencies on ecosystem services we document for the Lithuanian banks' corporate loan portfolios, **it is necessary to take into account the geographical specificity of Lithuania.**

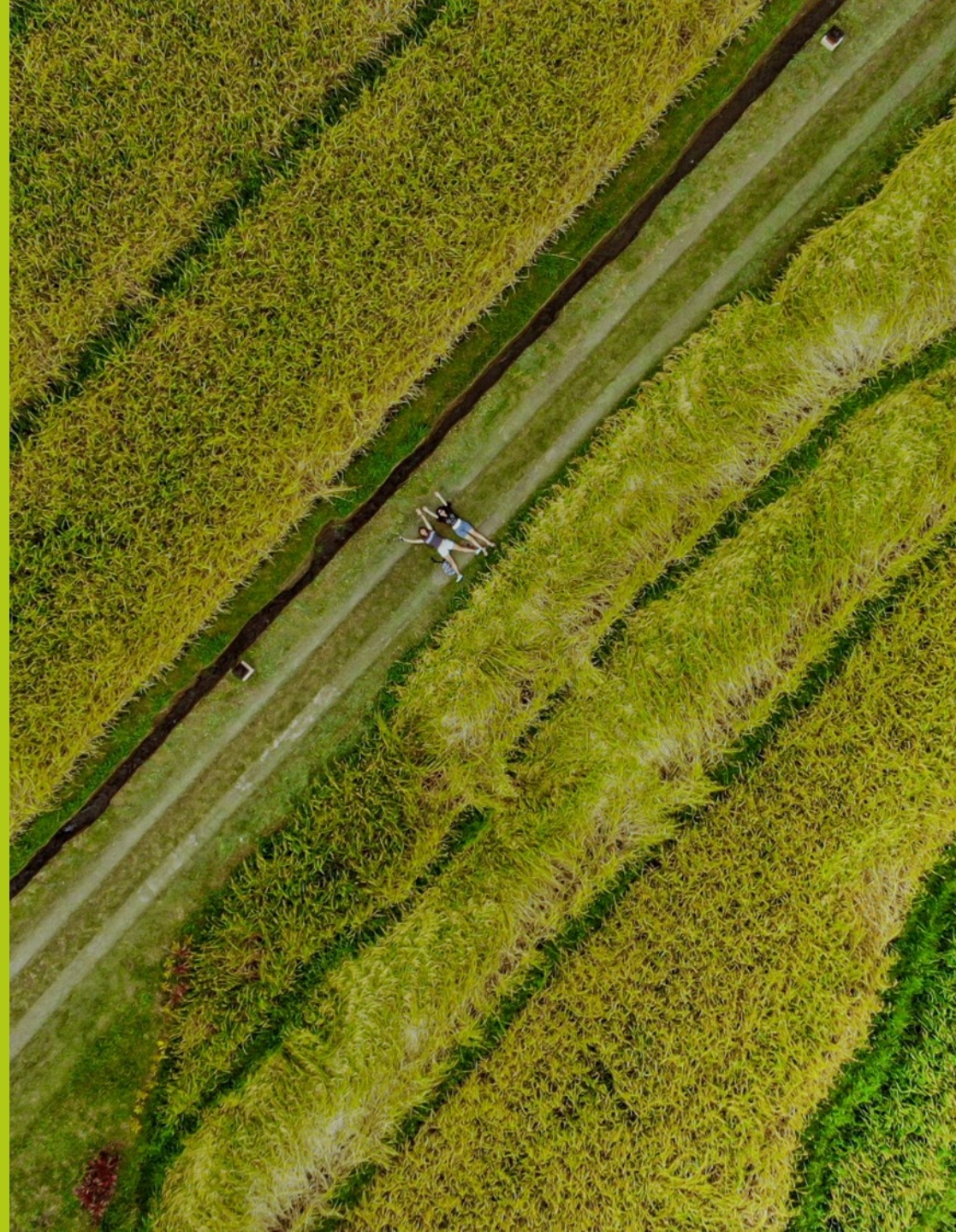
Specificity of Lithuania

- **Lithuania is one of the few countries in the world with abundant fresh ground water resources. Water stress is very low** in Lithuania compared to other OECD countries and **water is not considered a natural resource at risk**.
- According to the assessment of the European Systemic Risk Board and the ECB, **the level of physical climate change risk attributed to Lithuania is one of the lowest in the EU countries.** Lithuania is located in the midlatitude zone, where there is a high natural potential for adaptation to climate change; thus, **the risks posed by the dependence on ecosystem services associated with climate regulation and prevention of storms and floods are relatively lower than in other countries located in different climatic zones.**

Conclusion

- 70.1% of Lithuanian banks' commercial lending portfolio to be to firms with a very high dependence on at least one ecosystem service
- Lithuanian banks' commercial lending portfolio is highly dependent on surface and ground water provisions and climate regulation.
- The risks to bank loan portfolios of depleting these ecosystem resources are relatively lower in Lithuania than in many other countries.

Even though the nature-related financial risks are relatively lower in Lithuania than in many other countries, it is still necessary to continuously monitor and reevaluate these risks.



Thank you for your attention!