

# Supervisor's perspectives

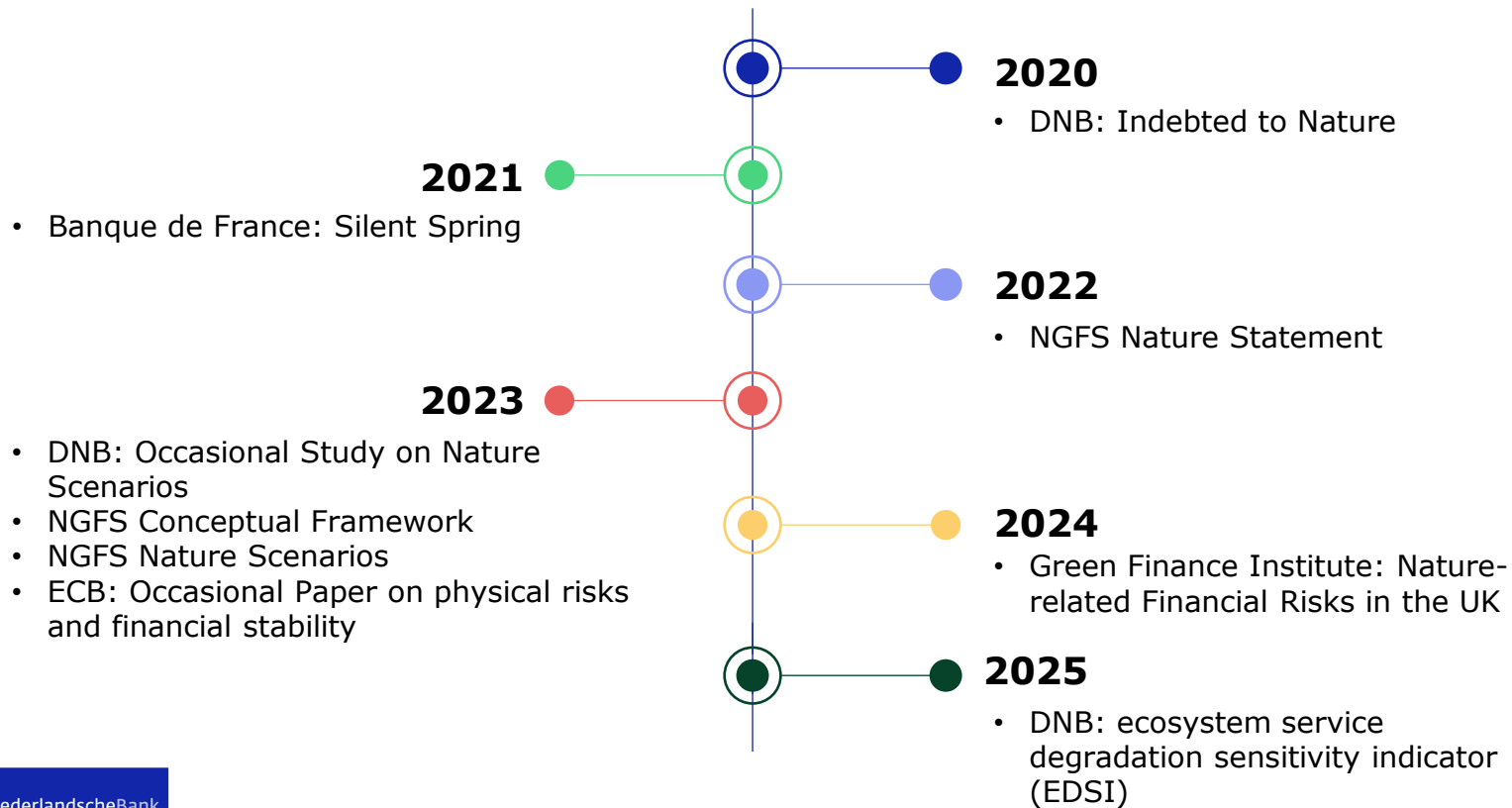
Nature-related transition risks quantification

DeNederlandscheBank

EUROSYSTEEM

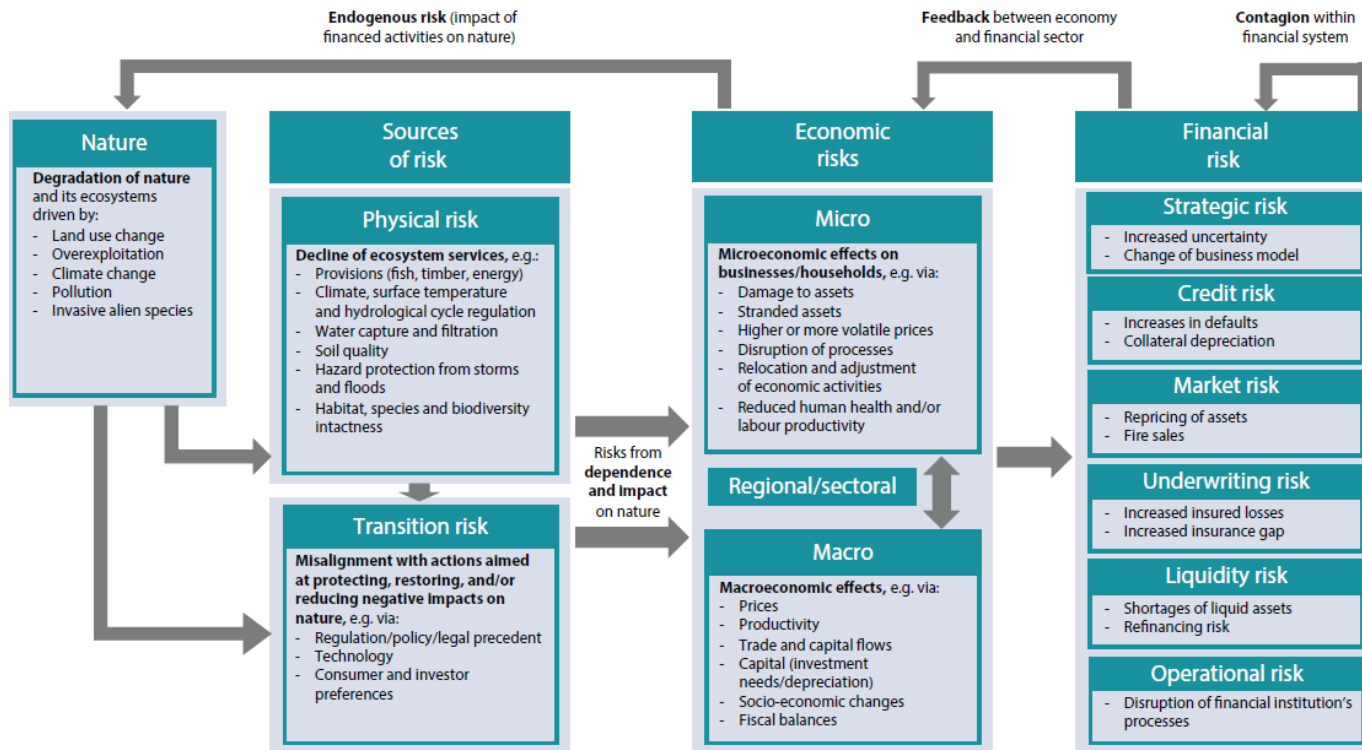
Gallet, S.Y.A. (Sébastien) (DNB - FS\_IFA)

# Looking back



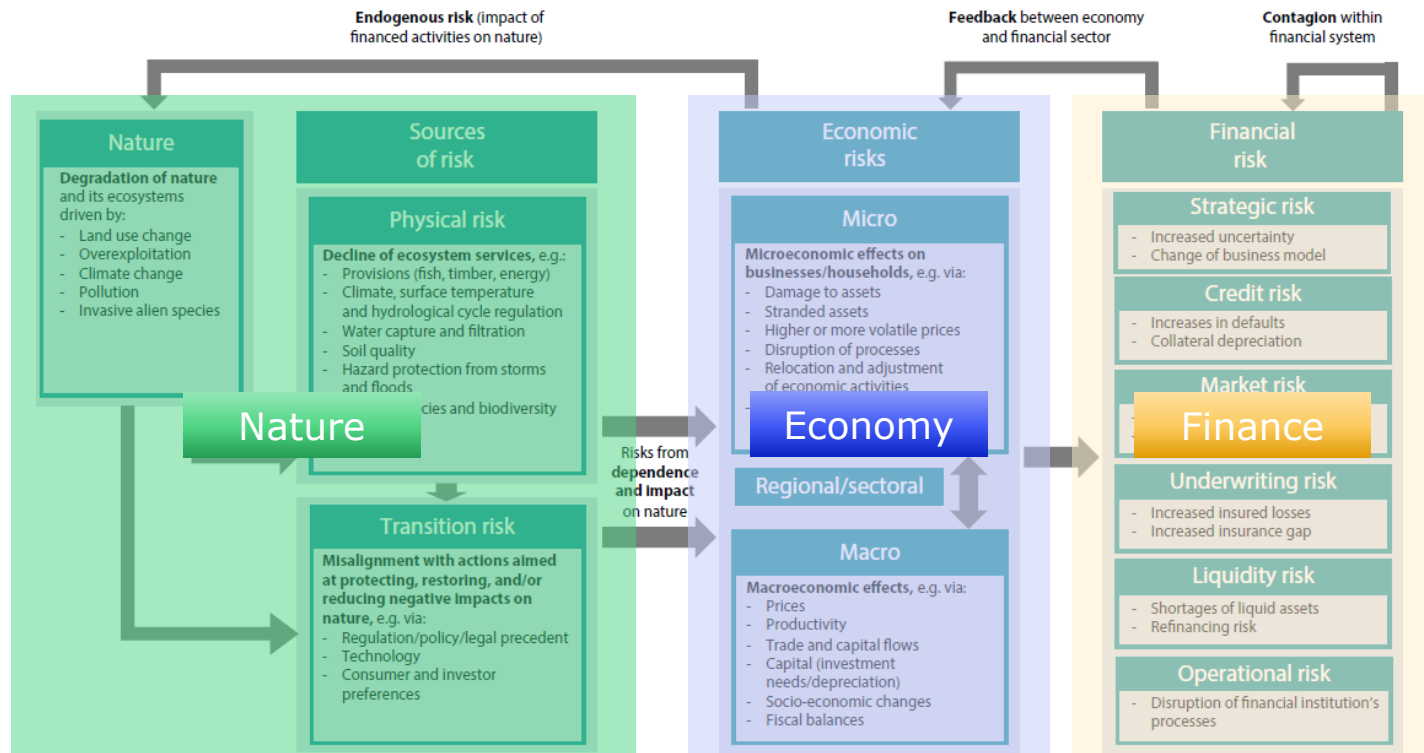
# Setting the scene

## A conceptual framework for nature-related risks



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## A conceptual framework for nature-related risks



# Nature-related risks and financial stability

DNB Occasional Study

Julja Prodani and Sébastien Gallet

DeNederlandscheBank

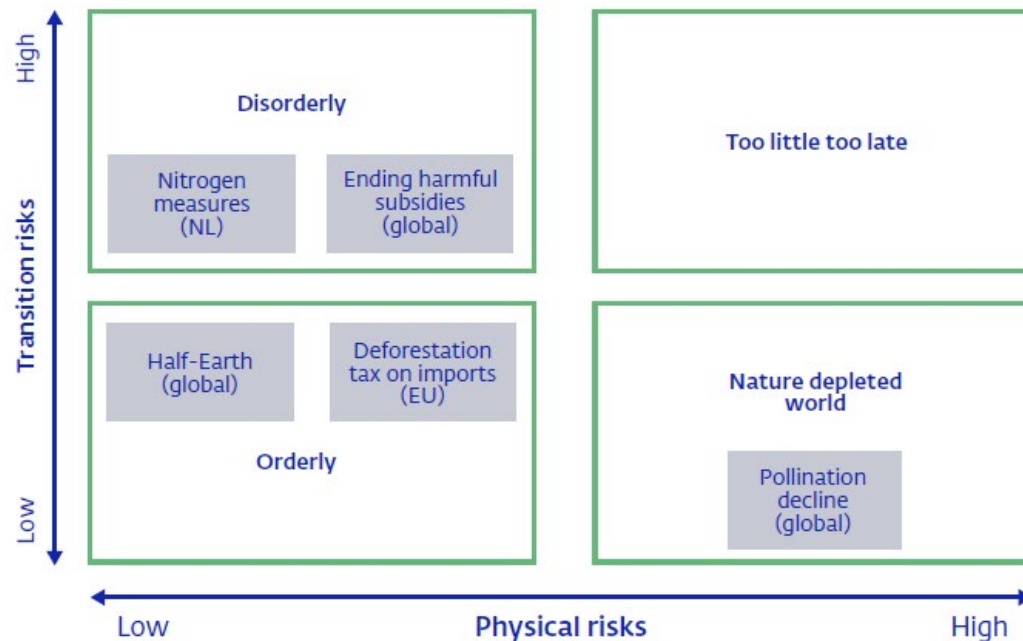
EUROSYSTEM

Julja Prodani & Sébastien Gallet

# The five scenarios analysed

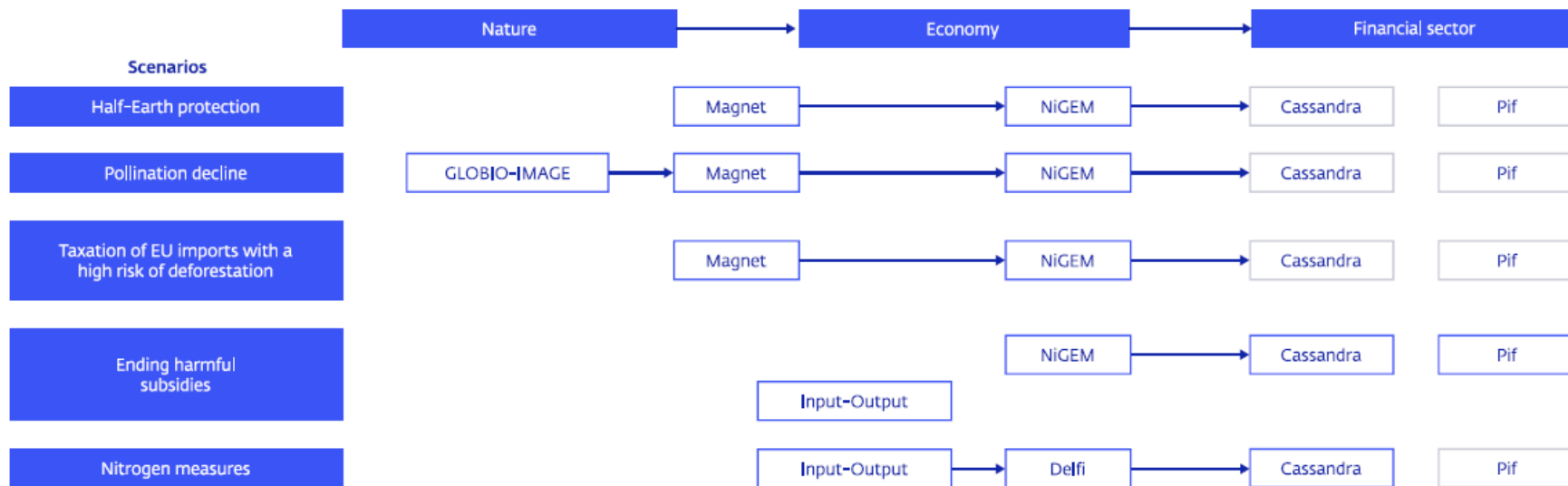
Aim: To estimate the potential losses financial institutions would incur under different nature scenarios

Figure 3 Adaptation of the NGFS matrix on the transition and physical risk dimensions of climate scenarios to nature-related scenarios



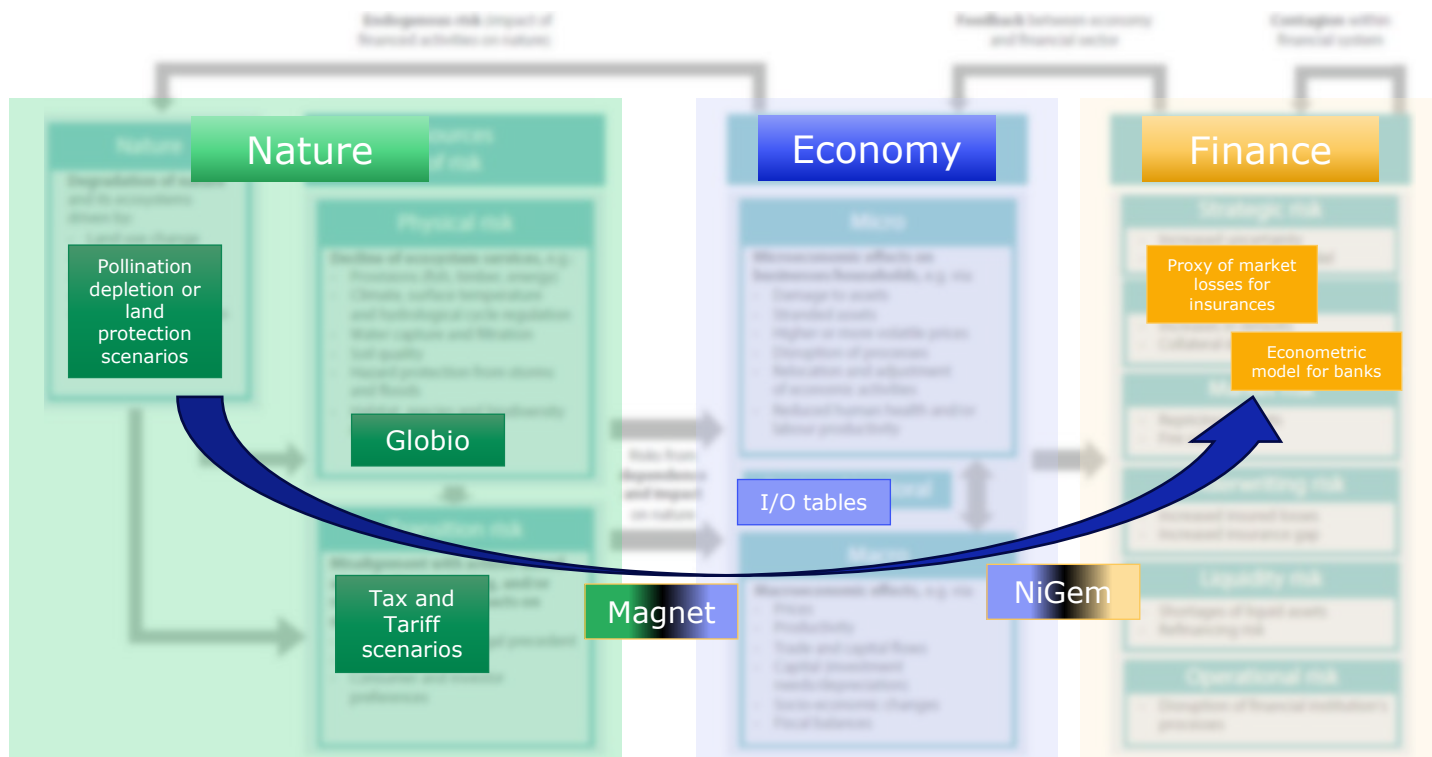
# Three steps: From Nature to Economy to Financial sector

Figure 2 The model chain used for each scenario



Notes: DELFI is DNB's semi-structural model of the Dutch economy; NiGEM is a structural model of the global economy; MAGNET is a computable general equilibrium model; Cassandra is DNB's top-down stress-testing model for banks; PIF is a simple model used to calculate the financial impact on pension funds and insurers. The grayed out models are not used to calculate an impact on the financial sector, given that the limited economic impact of these scenarios does not point to an impact on the financial sector.

# Back to the conceptual framework for nature-related risks

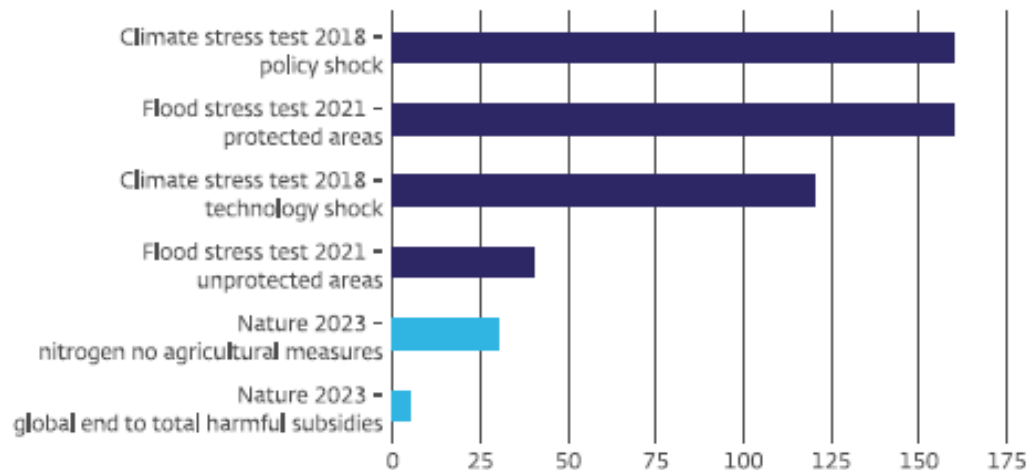


## Financial losses: credit losses for banks

The results are a direct reflection of the limited macroeconomic impact

Figure 17 Capital depletion due to credit losses

Rounded to multiples of 5 basis points



The methodological limitations point to a likely underestimation of the economic and financial stability impact

Scenarios are one-dimensional, missing real-world complexity

CGE models underestimate short-term stresses due to

- Substitution parameters calibrated on “a stable world”
- Estimating equilibrium results

Econometric model simplification

- aggregate variables (observed heterogeneity of sectoral economic impact is not considered )
- calibrated on historical data

## **The ecosystem service degradation sensitivity indicator (EDSI):**

A new framework for understanding the financial risk  
repercussions of nature degradation

*PBL – June 2025*

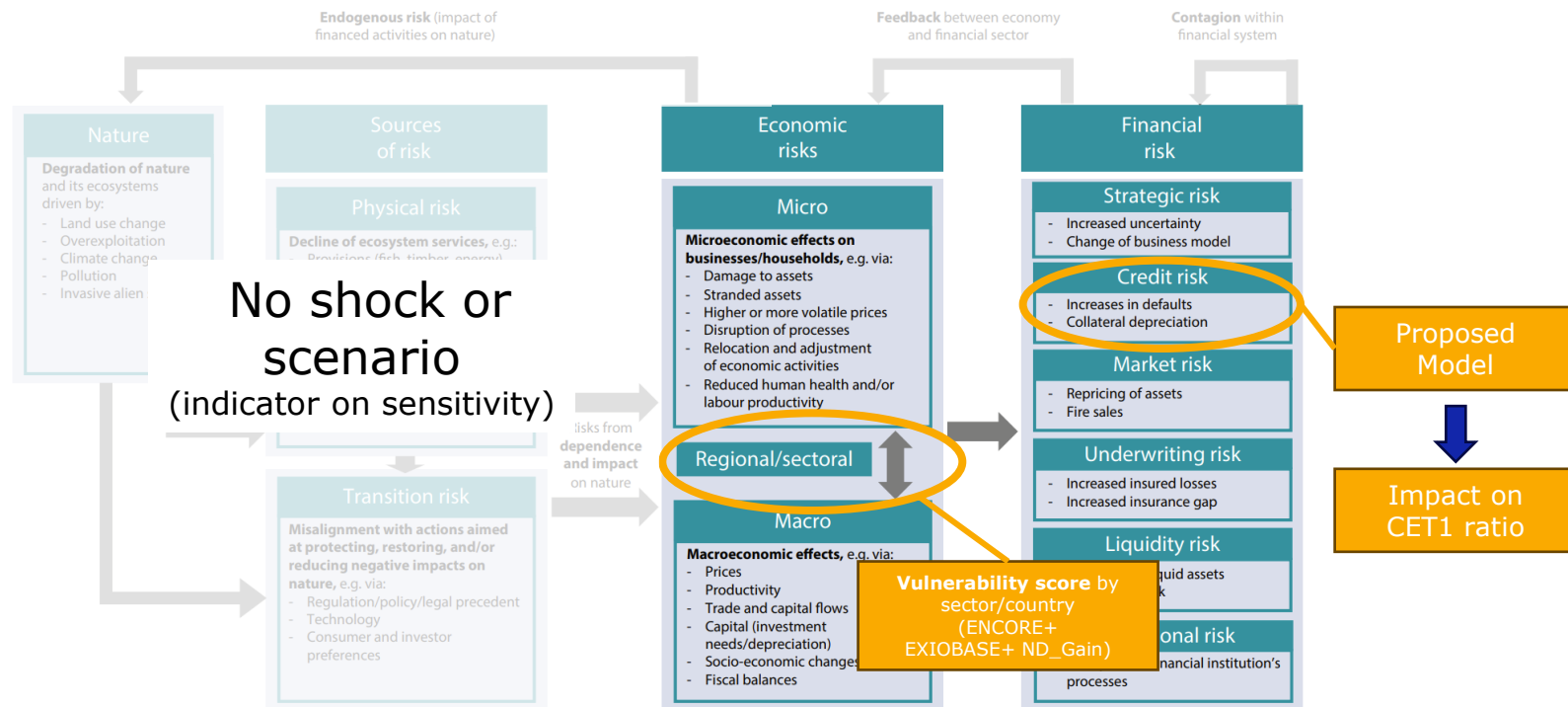
**DeNederlandscheBank**

EUROSYSTEM

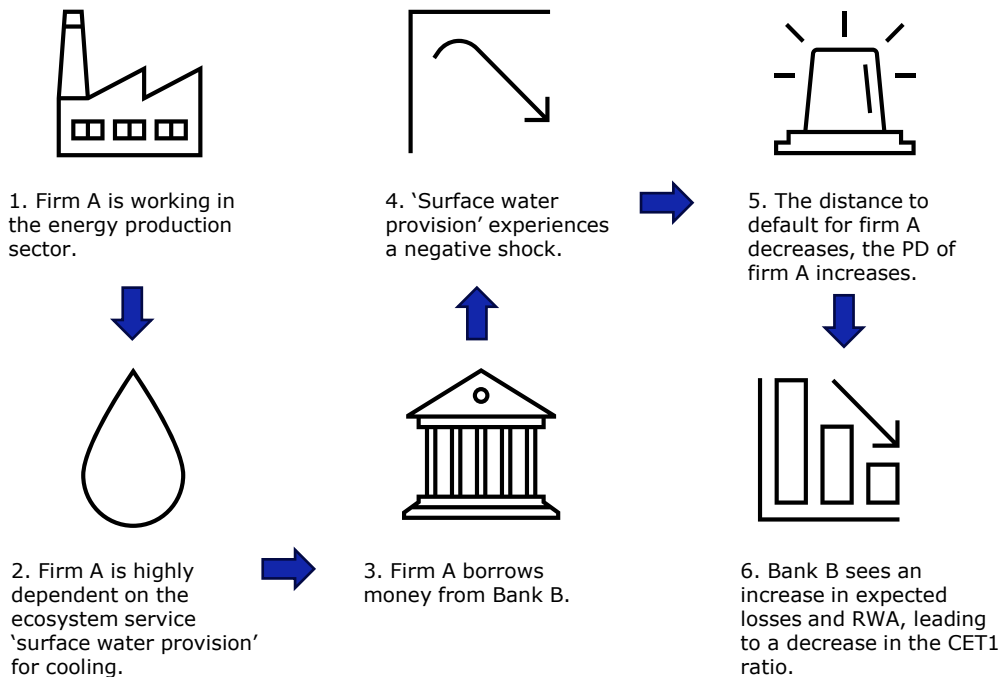
Julja Prodani & Sébastien Gallet

# Next phase: EDSI within the big picture

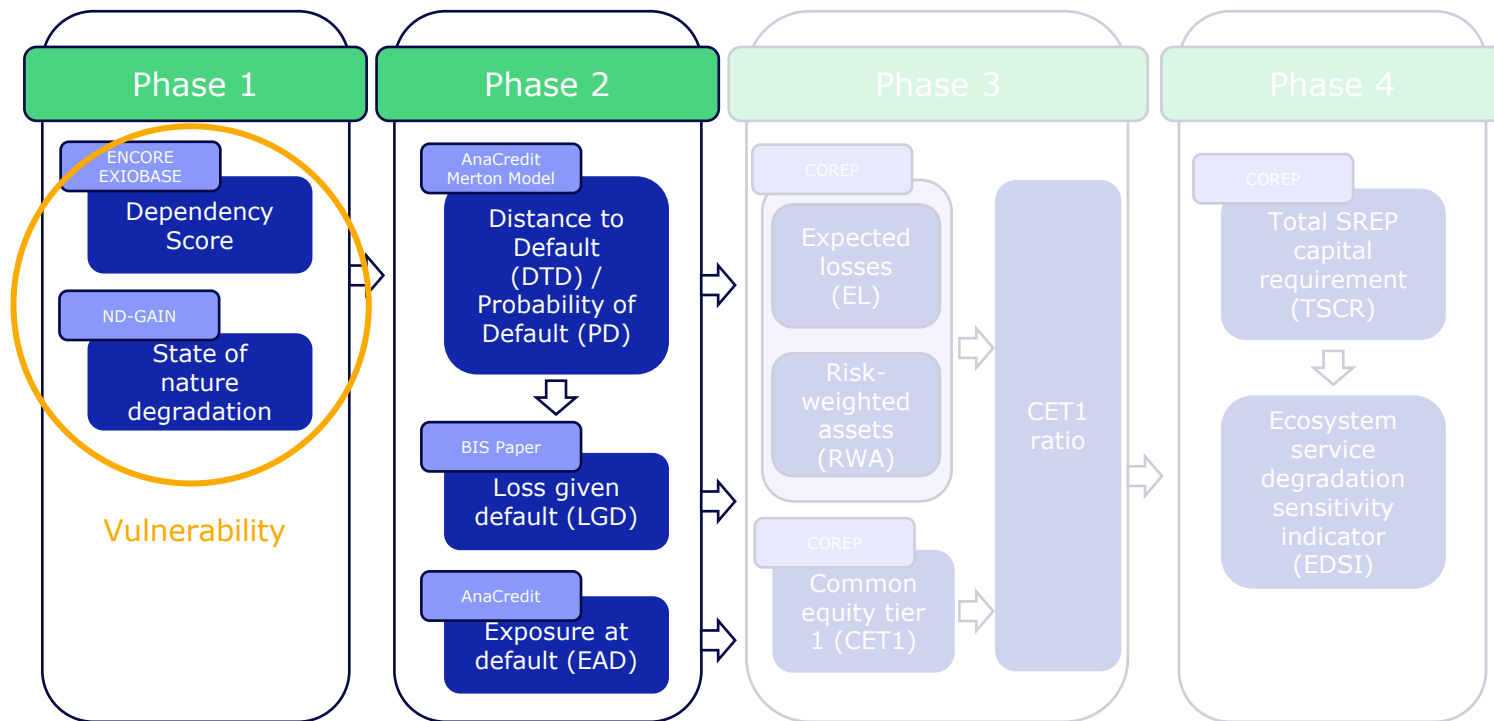
DNB Working paper 814, 27 August 2024



# Contribution: Intuition & Example

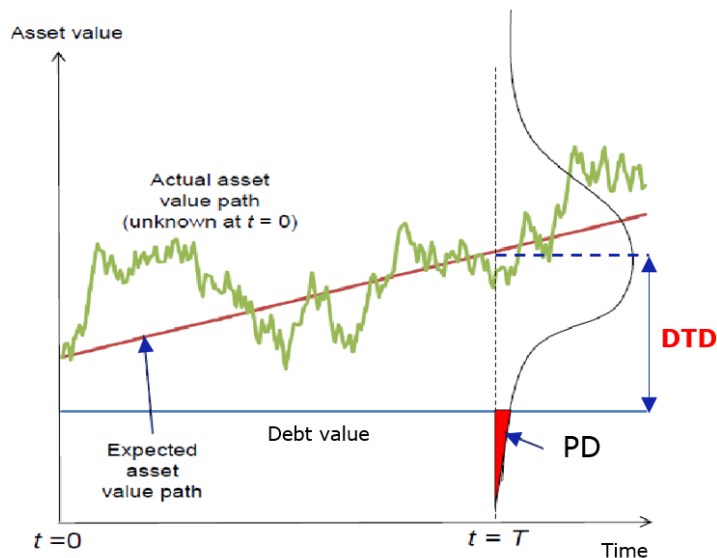


# Stylized phases of the Framework - Methodology



# The Modified Merton Model: Details on Phase 2

**1. The Merton model** sets the probability of default (PD) as a function of the distance to default (DTD).

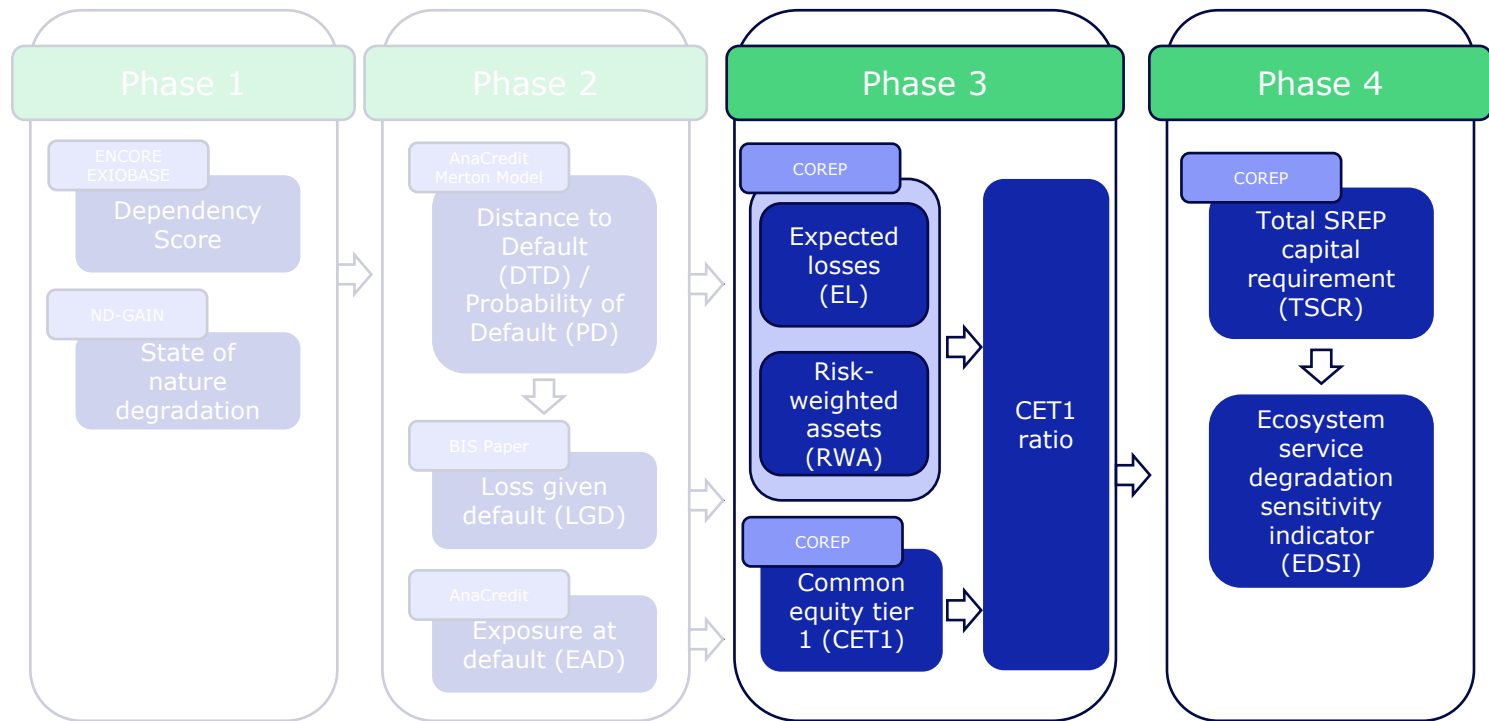


**2. Novelty:** Mathematically consistent modelling of nature degradation and its impact on a firm's balance sheet.

$$DTD_i^{dep} = DTD_i - \frac{\alpha_{ES} Vuln_{ES,i}}{\sigma_i}$$

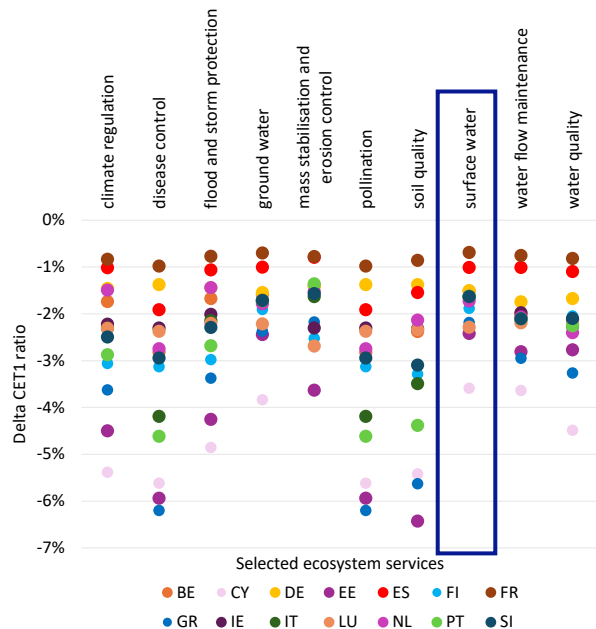
- $\alpha_{ES}$ , sets the overall level of the aggregated shock
- $Vuln_{ES,i}$ , specific per loan, mix of dependency, nature degradation and supply chain
- $\sigma_i$ , volatility of the asset value (linked to equity vol.)

# Stylized phases of the Framework - Methodology

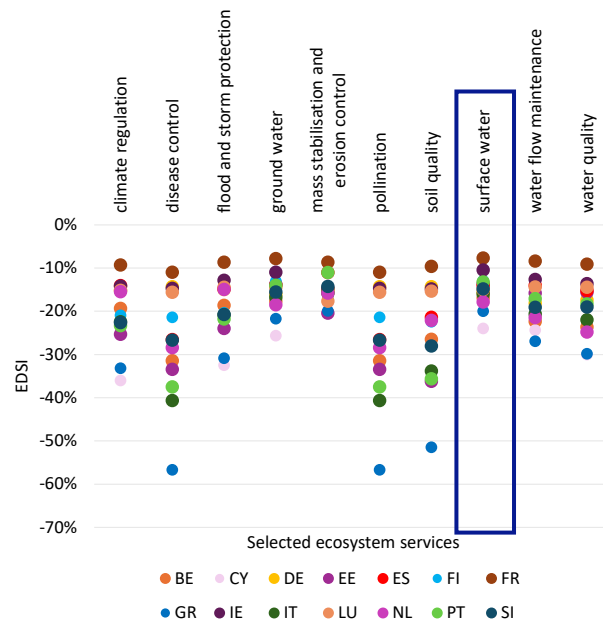


# Results with fixed depreciation rate of 1% per ES at the aggregated SSM level

ΔCET1 ratio



EDSI



# Research Highlights

## Credit Risk Estimation

1

- Integration of ecosystem service dependence and degradation into credit risk estimations

## Financial Risk Approach

2

- Introduction of a capital-based sensitivity indicator, “exposure” → “financial risk”

## Comparability

3

- Cross-bank and cross-country comparisons of potential financial losses

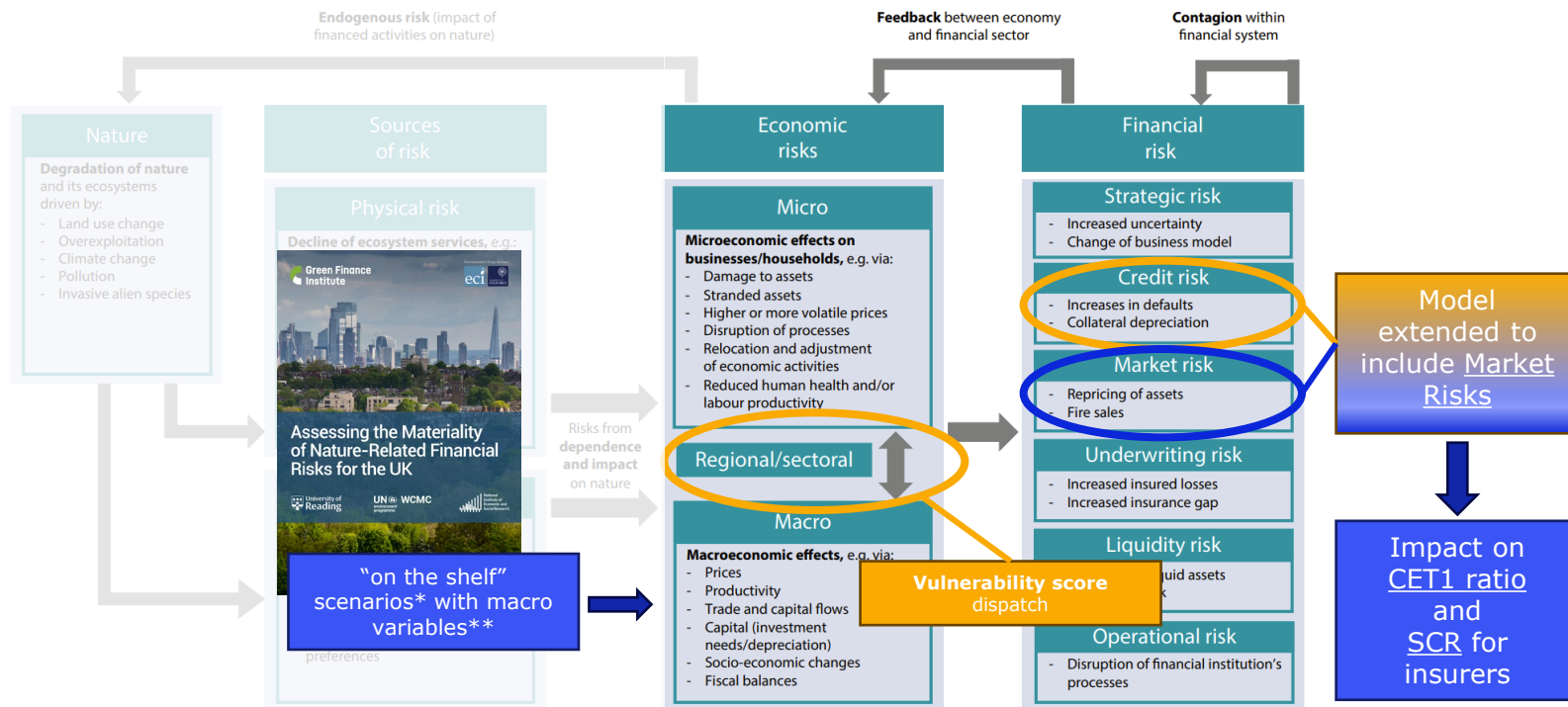
## Flexibility

4

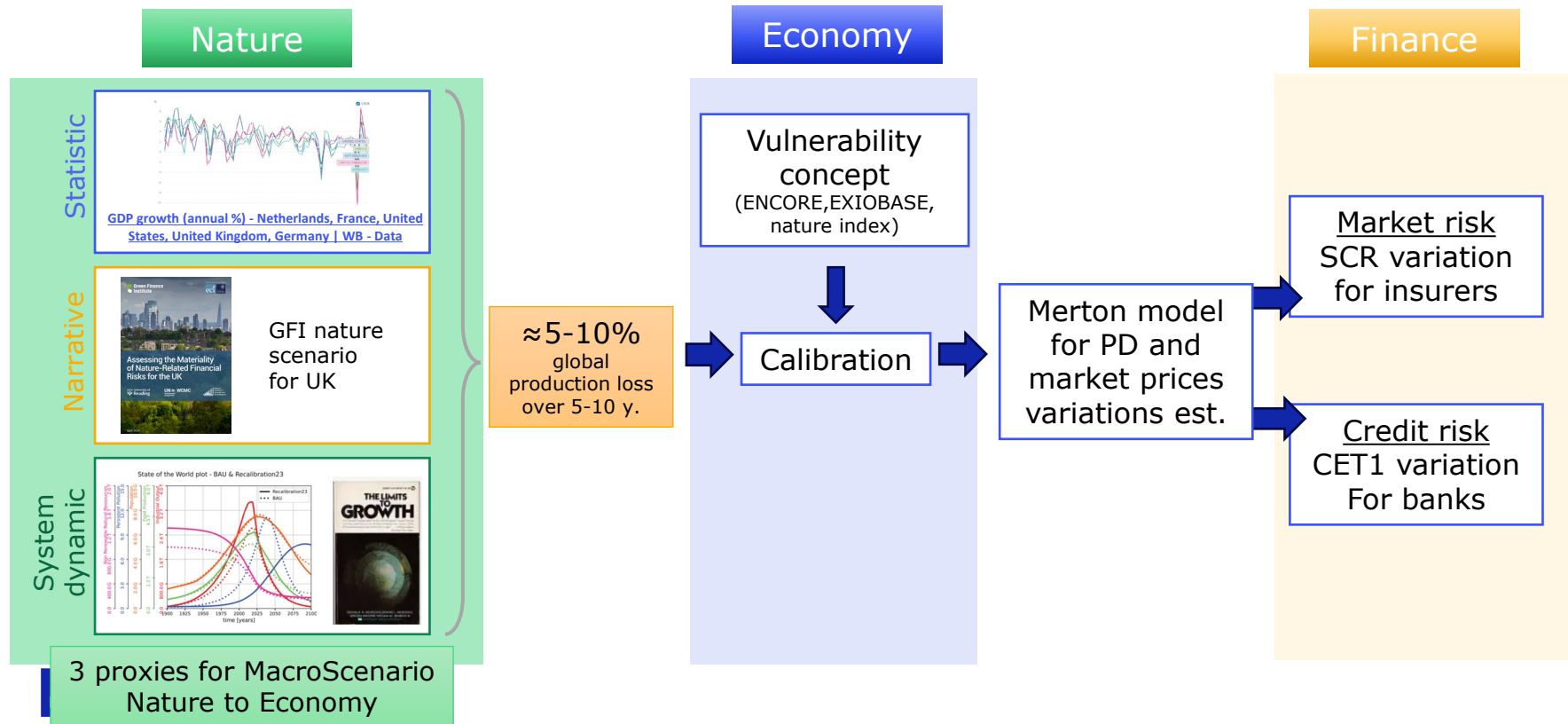
- Integration of PR and TR
- New tool for stress tests
- Possible extension to market risk

If time allows...

# Objectif 2026: Credit Risks and Market Risks for Banks and Insurers with stress test based on external nature-to-macro scenario



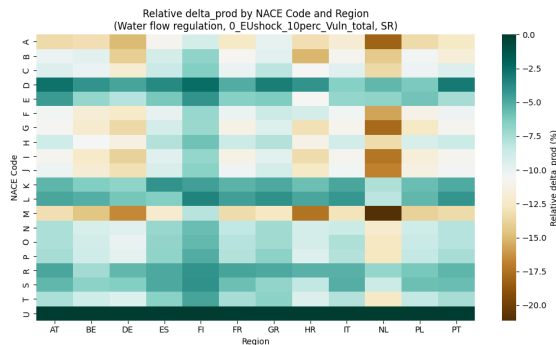
# Credit Risks and Market Risks for Banks and Insurers : Concept



# Credit Risks and Market Risks for Banks and Insurers : Preliminary results

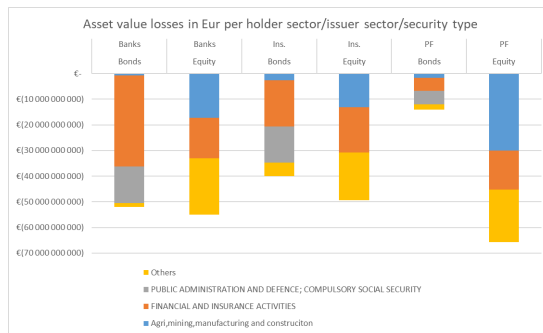
## Production losses dispatch

(according to EXIOBASE  
ENCORE and ND-GAIN)



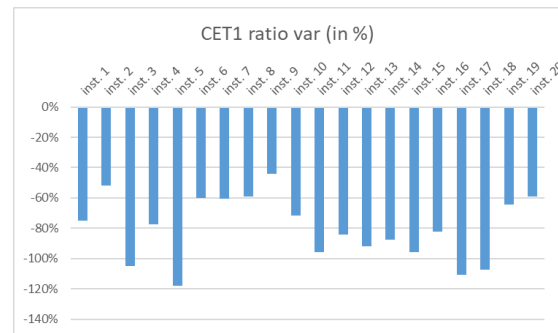
## Market losses

(according to Merton model  
extrapolation and SHS-S)



## Prudential ratios losses

(according to regulation,  
simplification and COREP)



# Literature

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