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CREDIT RATING MODELS DURING COVID-19 AND CREDIT STRESS TESTING

Seminar Case Studies

ZANDERS
PERFORMANCE WHEN IT COUNTS

Agenda

Credit Risk Stress Testing – General Introduction

Stress testing is used by financial institutions to provide insights into potential losses that could emerge under adverse economic scenarios.

1. Capital Planning

The insights obtained by stress testing are utilized to identify and quantify the potential impact of adverse scenarios on their financial position and performance, in order to:

- Determine reserve **capital** to withstand **losses**
- Maintain an acceptable level of capital adequacy

2. Compliance

Comply with regulations:

- European Banking Authority **(EBA):**
  - 3-year time horizon
  - Standardized scenarios (provided by regulator)
- Internal Capital Adequacy Assessment Process **(ICAAP):**
  - Multi-year time horizon
  - Institution specific scenarios

3. Internal

Possible other internal uses:

- Assess the adequacy of an institution's liquidity and funding positions
- Identify vulnerabilities in the institution's credit risk profile
- Reverse stress testing

Credit Risk Stress Testing – Simplified Calculations

- Hypothetical portfolio of loans, with maturities beyond the horizon of the stress test. Apart from the credit part no revaluation of the loans is necessary.
- Possible to forecast the **Probability of Default (PD)** with a suitable model under different stress scenarios.

- For each of the three years of **EBA stress test** one needs to evolve the static portfolio after calculating the stressed PD for each year and then calculate the stressed RWA

- There are multiple ways of modelling this. We propose to split exposures each year between non-defaulted and defaulted exposures, and not look at other rating transitions.

- **Expected Loss** is a measure of loss in case of default and can be calculated under stress scenario:

$$EL = PD \times LGD \times EAD$$

- **Loss Given Default** is often modelled separately but for this project can be taken as a fixed value of 25%.

- We propose to calculate IRB **risk weights** using the relevant IRB formula (https://www.bis.org/basel_framework/chapter/CRE/31.htm)

- To determine the minimum amount of capital necessary, **Risk Weighted Assets (RWA)** are calculated under the stress scenarios:

$$RWA = RW \times EAD$$

Stress Test Scenarios
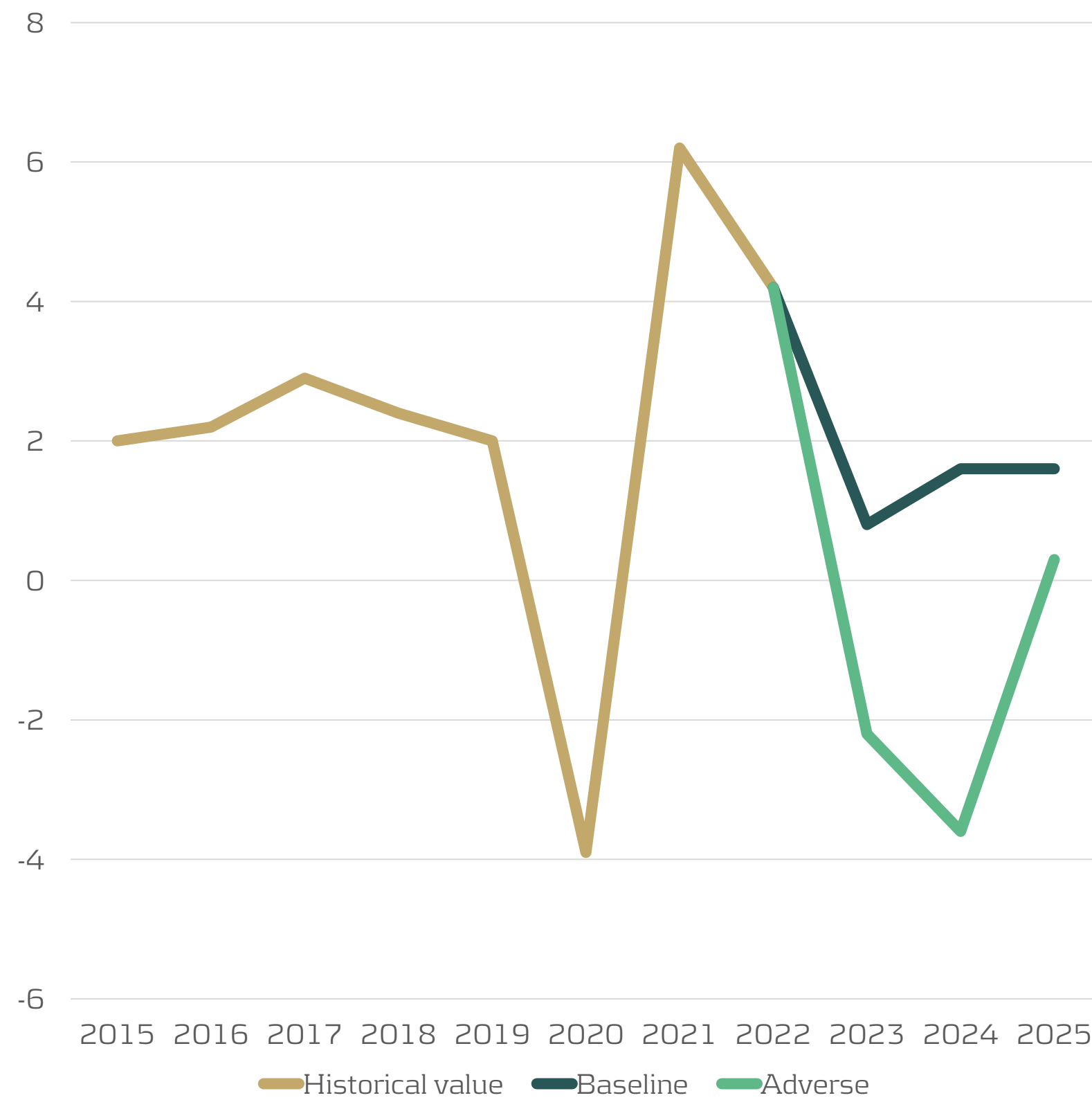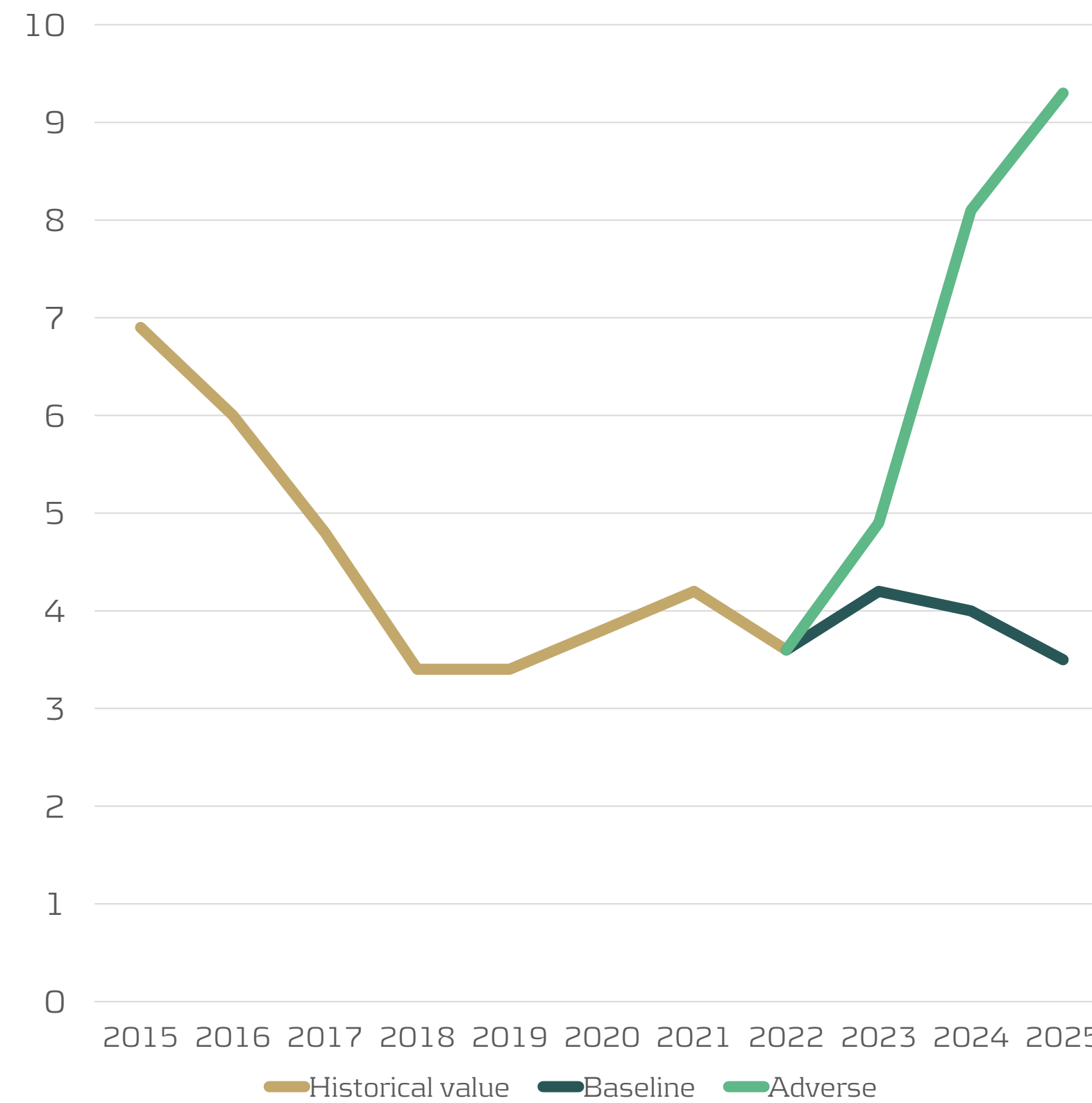
EBA Stress Test Scenarios – Macro Economic Drivers
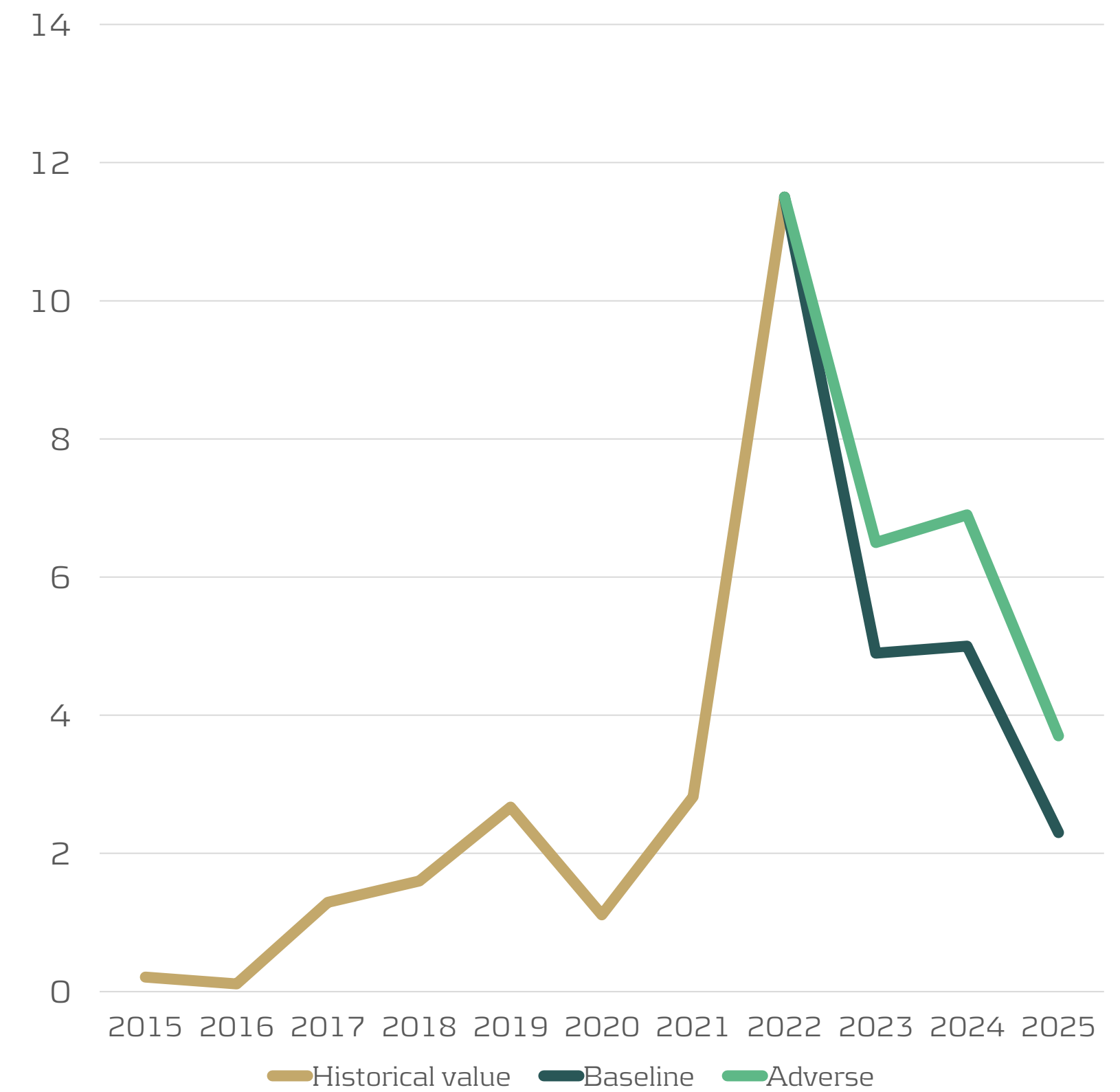

EBA Stress Test Scenarios 2023 (europa.eu)
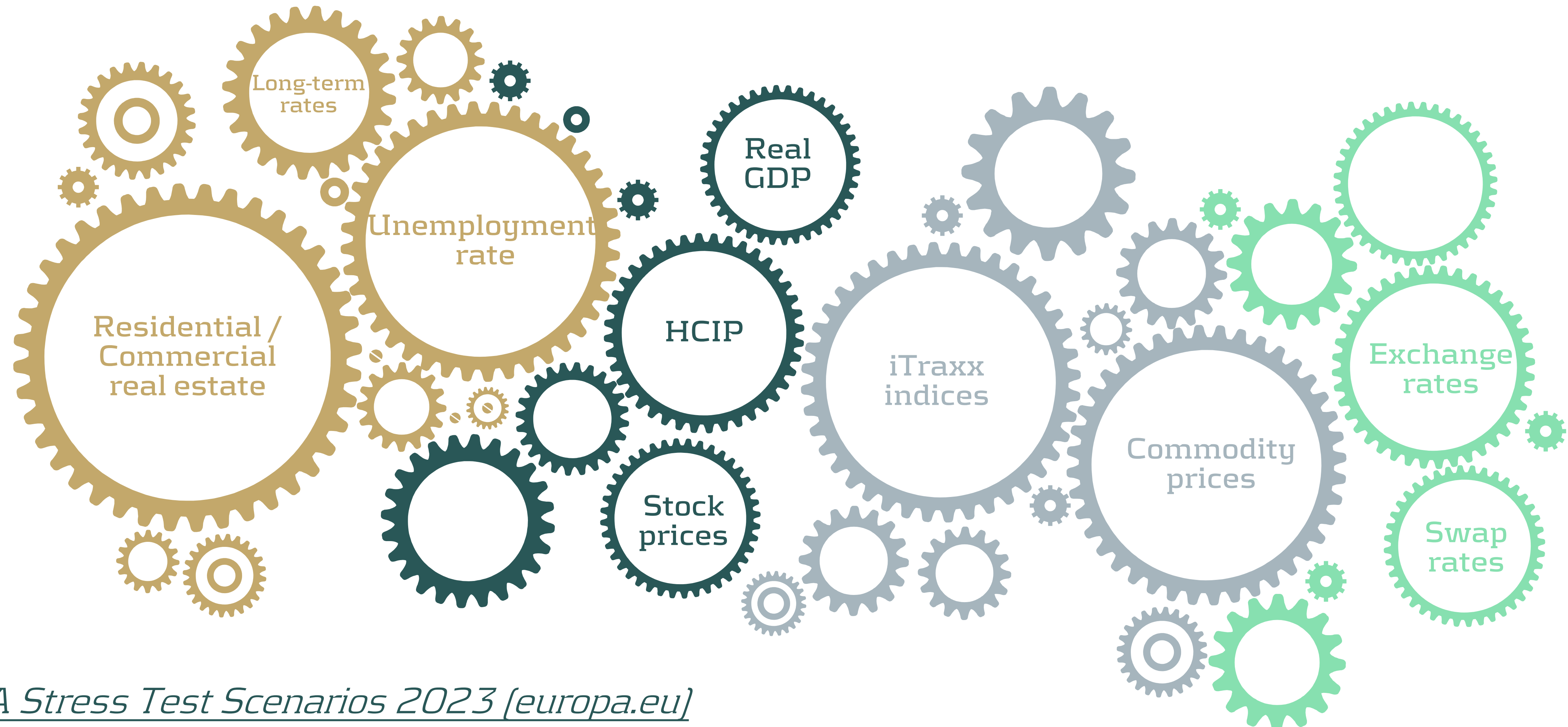
Stress Test Scenarios

EBA Stress Test Scenarios 2023[1,2]

Real GDP growth in NL — Historical value, Baseline, Adverse

Unemployment rate in NL — Historical value, Baseline, Adverse

Harmonised Index of Consumer Prices NL — Historical value, Baseline, Adverse

[1] Source: EBA Stress Test Scenarios 2023 (europa.eu)
[2] Source: Centraal Bureau voor Statistiek

Reverse Stress Testing

- Multiple definitions of bank failure

  - Within Credit Risk Stress Test context: bank failure is defined as the CET1 ratio dropping below a prescribed regulatory minimum
  - **CET1 ratio**: compares a bank's capital against its assets
  - In this project we simplify the definition of a bank failure as when the **RWA** of our portfolio exceeds a fixed **limit** *(to be provided on January 26th)*

- Reverse Stress Testing is currently increasing in importance and is regarded by many practitioners as a more meaningful approach than standardized stress tests such as the EBA stresses.

- Important is that the scenario is still **plausible** and designed for your **specific** portfolio.
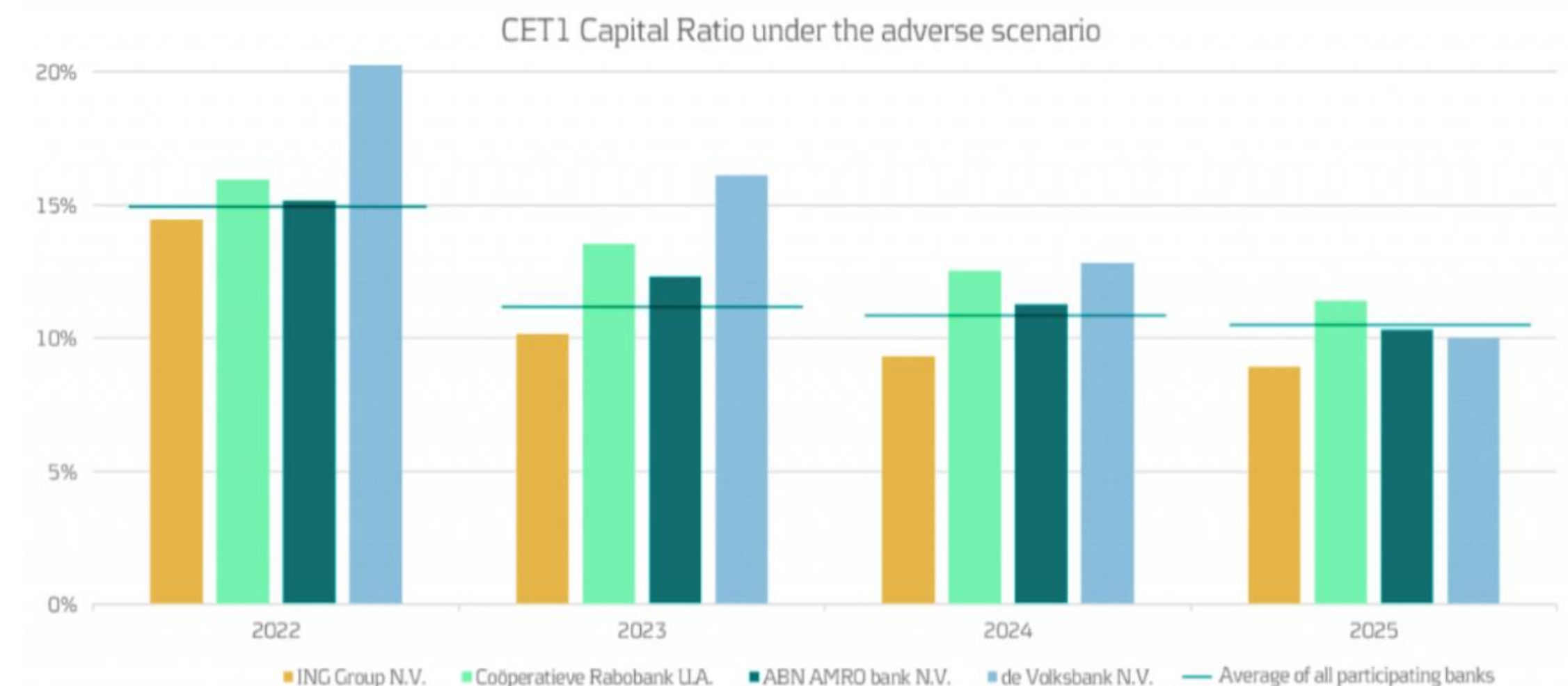
Source: Performance of Dutch banks in the 2023 EBA stress test - Zanders (zandersgroup.com)

The case
How to design a PD rating model suitable for stress testing?

A   What kind of model?

PD model(s) for corporates in a SME portfolio of EU companies

In this model you are going to predict the probability of default for corporates in our portfolio (preferably in Python).
The model should be suitable for the EBA stress tests and reverse stress testing.

B   What do you get?

We provide you with a large dataset:

- An equally weighted SME portfolio with EU companies: containing a time series of financials of corporates (candidate risk drivers of your model)

A link to EBA 2023 stress test scenarios

3   What to do?

1. Identify relevant risk drivers and decide if and how to transform them
2. Find a suitable PD model that can be used for stress testing
3. Perform the latest EBA stress test (incl. RWA calculations)
4. Come up with a plausible reverse stress test scenario, based on a limit of RWA *(to be provided on 26 January)*

Next steps

- Present research proposal and first data analyses on January 26, 12:00 at Zanders office (incl. lunch):
  - Data processing:
    - What is the target you are modelling, test/train split, etc…
  - Present your initial PD model
    - Most significant drivers (how you transformed them)
    - Model performance
  - Present your initial ideas on how to apply different techniques to ensure the model is suitable for stress testing

- Preliminary results will be presented on Thursday February 22, 13:00 at Zanders office:
  - Present your progress on applying different techniques to incorporate stress testing
  - Show stress test results

- Final presentation on March 22 at Erasmus University:
  - Present your final report
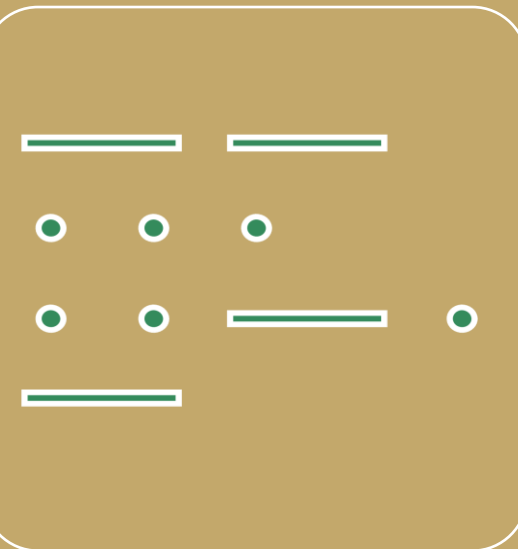 - Advise us on how we should leverage your model into our day-to-day modelling work
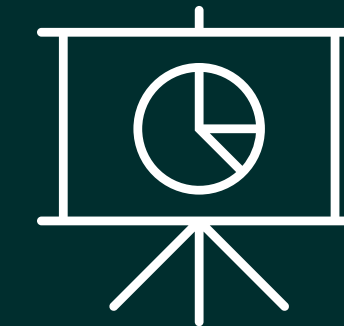
Finally

For questions:
eurseminar@zanders.eu

Make your codes readable as you will have to share them with us!

Present your results in our department meeting!