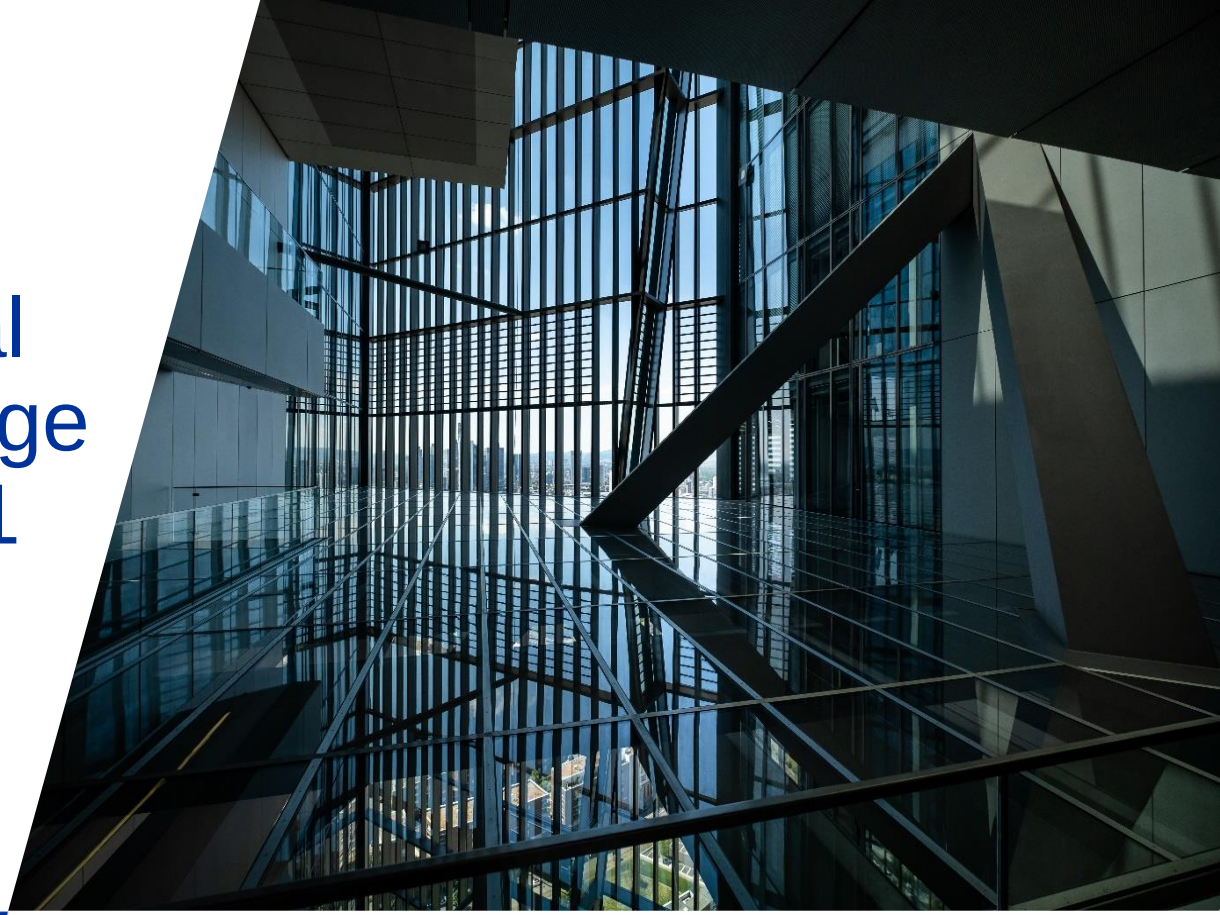
EUROPEAN CENTRAL BANK

EUROSYSTEM

Macroprudential and climate change stress test 2021



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03/09/2021

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SSM/EBA Banking Stress Test: Key findings and the way forward

Macroprudential stress testing: motivation

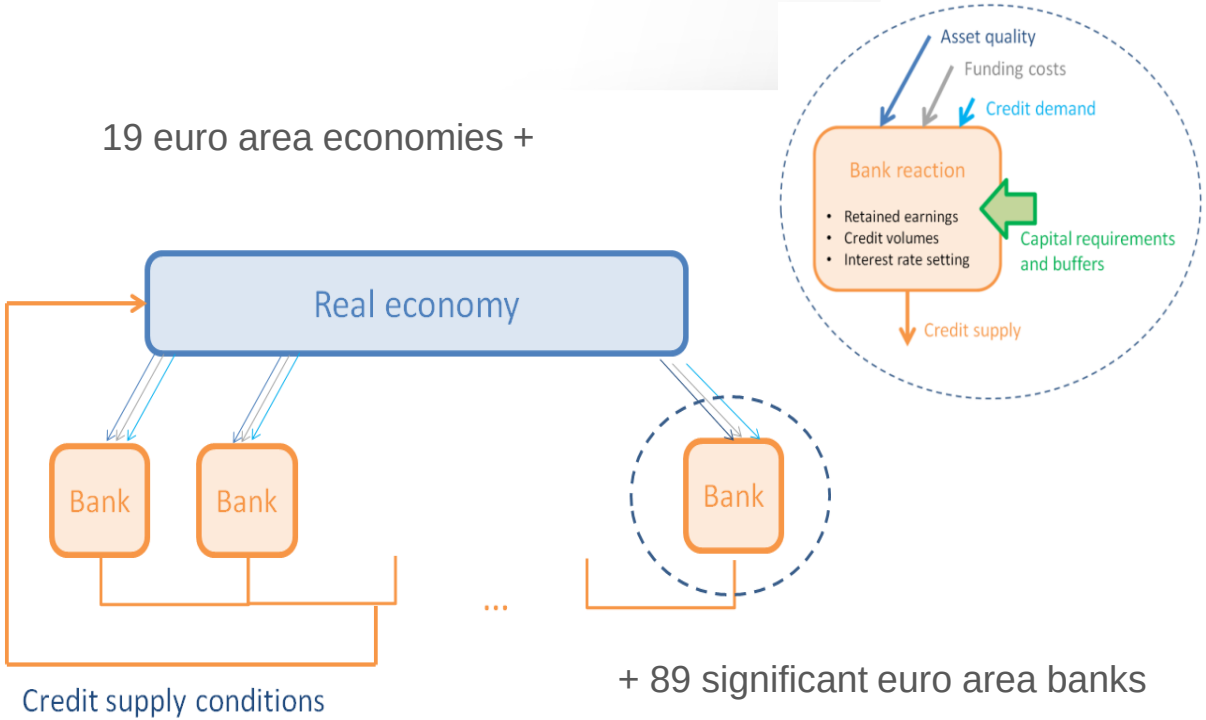
Why?

- A complementary metrics for judging **the resilience** of the banking sector as a whole by acknowledging endogenous reactions of banks
- Informs banks and supervisors about the system-wide consequences of **banks' most likely decisions**, possibly reducing coordination failures
- Validates the appropriateness of the calibration and **phase-in of policy measures**

How?

- Two scenarios 2021-2023 from the EBA/ECB EU-wise stress test:
  - Baseline
  - Adverse
- **Dynamic balance sheet**: banks react to scenario adversity
- Two **amplification mechanisms**:
  - Solvency-funding cost
  - Banking sector-real economy
- **Policies** (bank-specific): supervisory and macroprudential capital releases (incl. changes in the definition of the leverage ratio), profit distribution restrictions, public guarantees and moratoria

Macro-micro model*

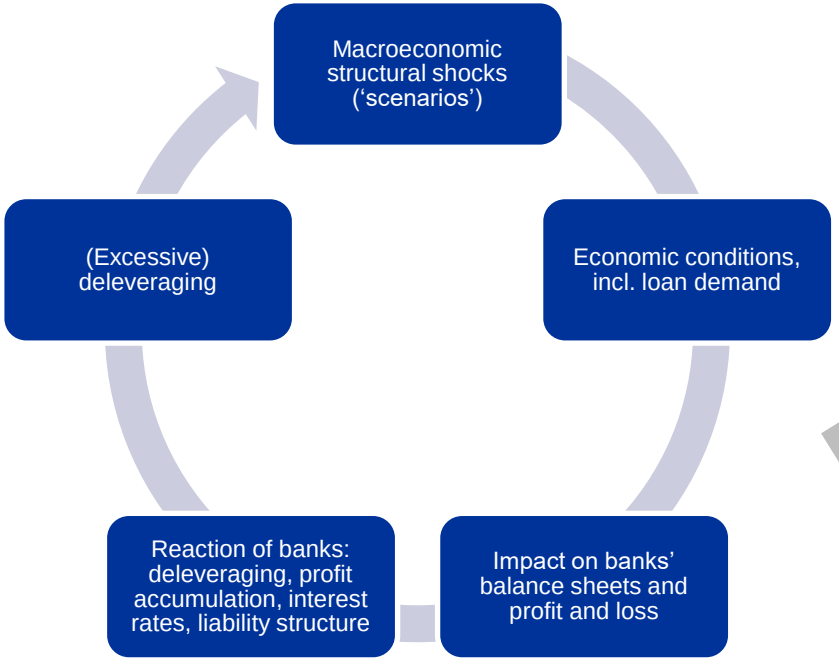


- Semi-structural design that combines empirical identification, economic theory, accounting and regulatory principles
- Detailed exposition of banks' balance sheets and profit and loss accounts
- Mapping economic scenario into banks' balance sheets
- Estimated banks' reaction functions for lending, deposit volumes, profit distributions, interest rates, write-offs

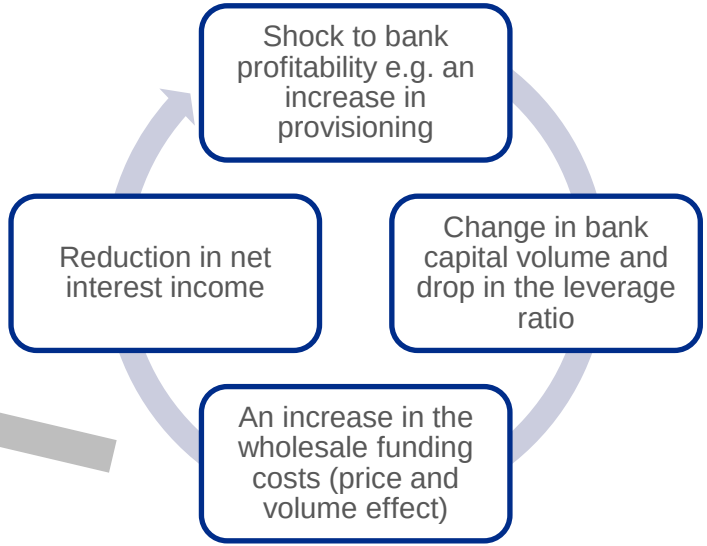
*See: Budnik et al (2020), Banking euro area stress test model, ECB Working Paper No. 2469

Amplification

Banking sector – real economy feedback loop

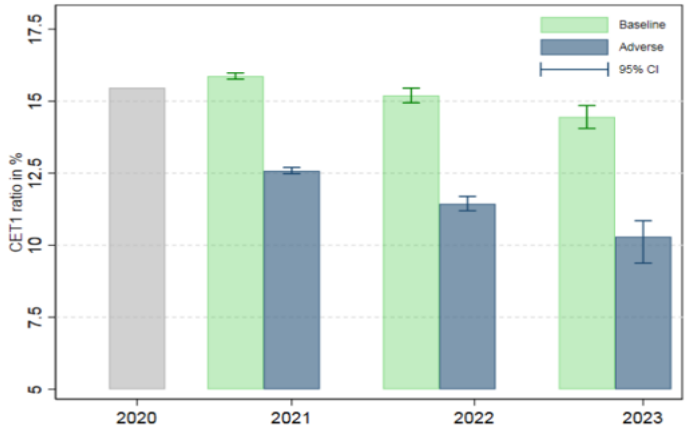


Solvency – funding costs feedback loop



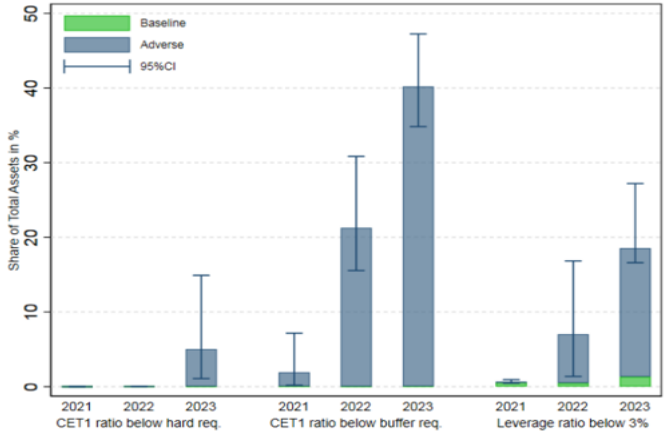
2021-23: the banking sector stays resilient after the pandemic

System-wide CET1 ratio



Banks below regulatory thresholds

(as % of system assets)

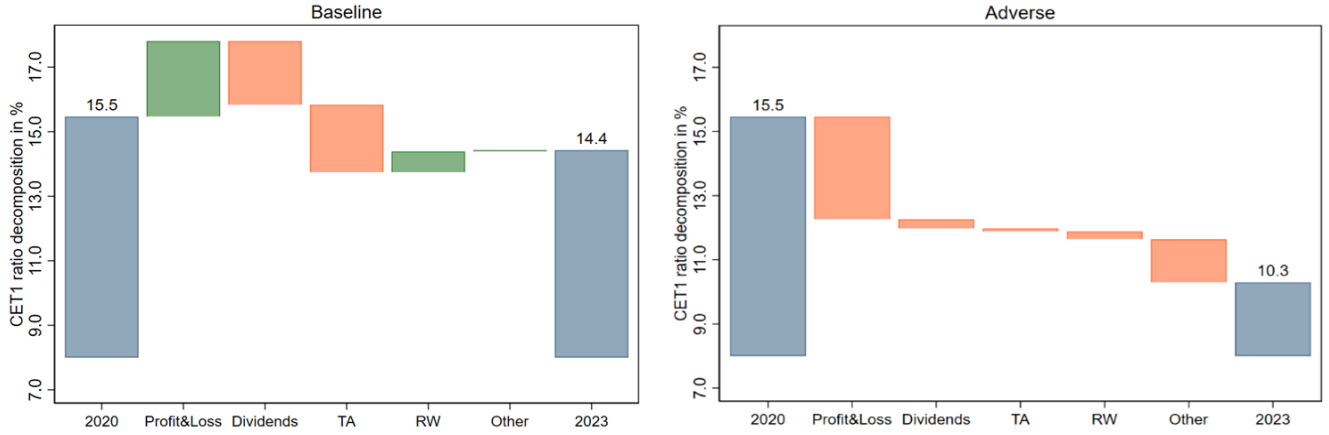


- The system-wide CET1 ratio in the baseline scenario gradually returns to its pre-pandemic level, while in the adverse scenario it goes down to 10.3%
- In the adverse scenario, banks adding up to 43% of SSM banking sector assets (28 banks) dip in their CET1 regulatory threshold incl. capital buffers in the adverse scenario, therein 14% also below their hard requirements (10 banks), which compares to the results of the macroprudential stress test 2020 (45% and 29 banks)

Profit distribution policies influence bank solvency

Contributions to system-wide CET1 ratio 2023 versus 2020

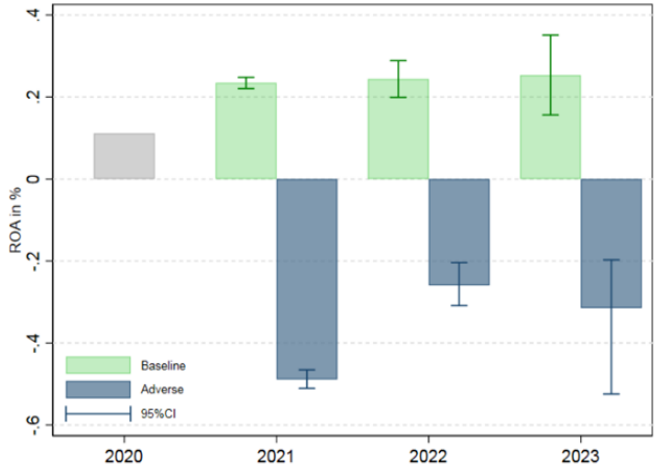
(percentage change of CET1 ratio components)



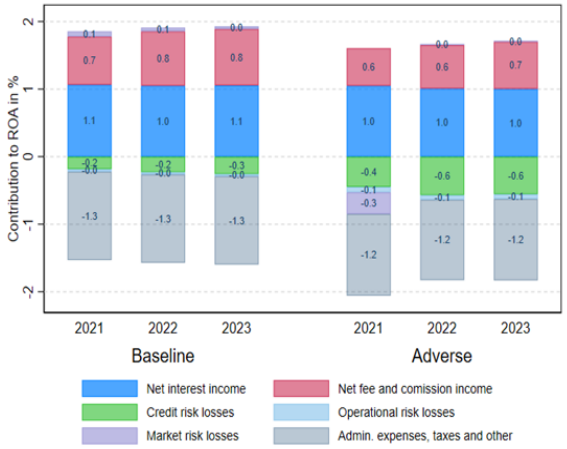
- The reduction of the system-wide CET1 in the baseline scenario is driven by expansion of assets and of (outstanding) dividend pay-outs, while in the in the adverse scenario, by capital depletion

Stable profitability outlook in the baseline

Return-on-assets



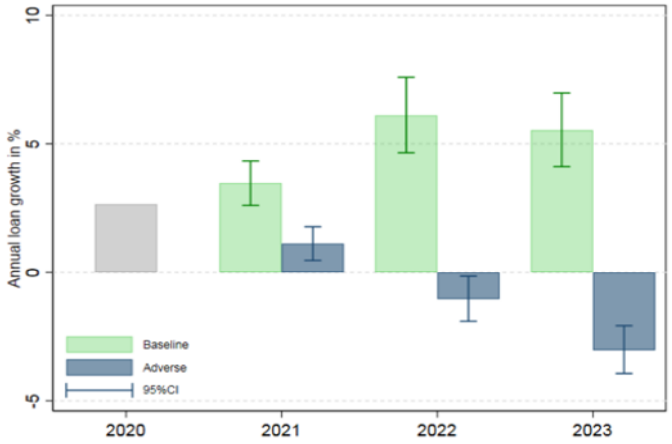
Break-down of ROA



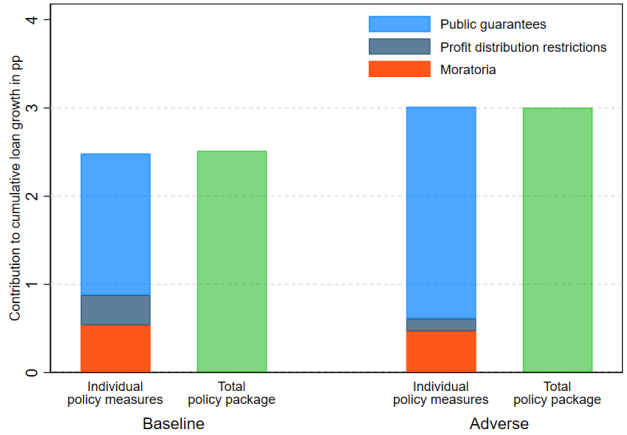
- Improving bank profitability in the baseline scenario, though it stabilises at relatively low pre-pandemic levels
- Credit and market risk losses drive the deterioration of bank profitability in the adverse scenario

COVID-19 mitigation policies continue to support lending

Annual loan growth to euro area non-financial private sector



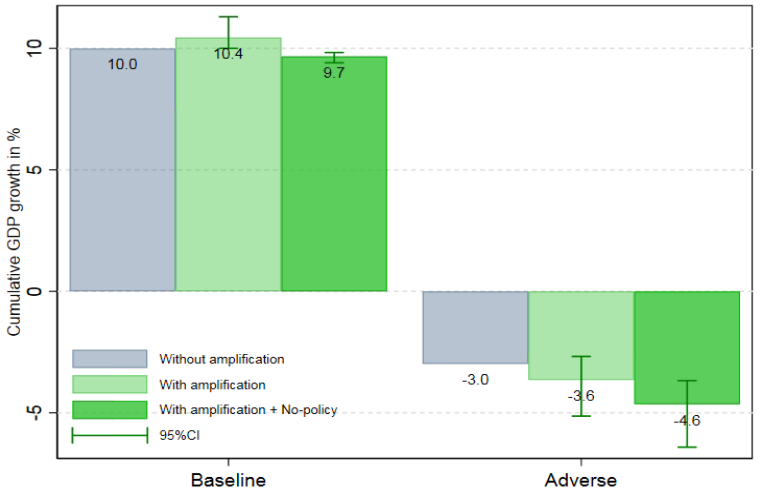
Lending impact of COVID-19 mitigation policies 2021-2023



- Robust, though also uncertain, lending dynamics in the baseline scenario
- Banks deleveraging in the adverse scenario
- Different relative role of remaining individual Covid-19 mitigation policies in the two scenarios

COVID-19 policies mitigate the adverse feedback loop

The cumulative growth of GDP in 2021-2023



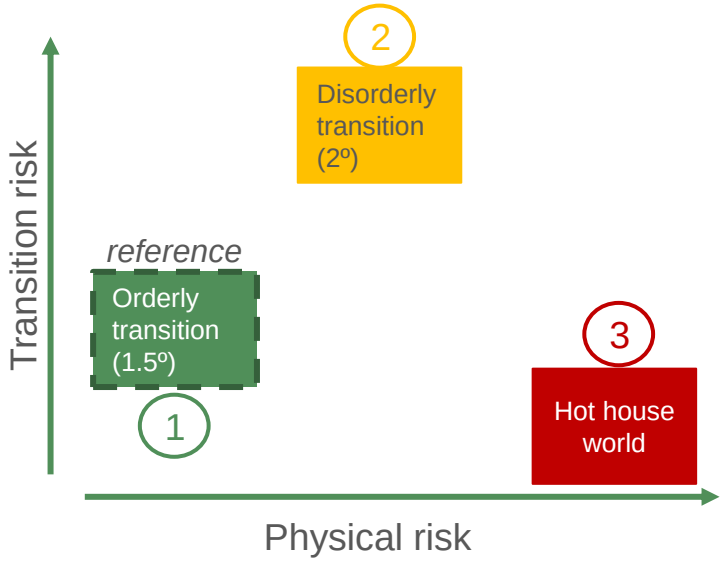
- Moderate role of the feedback loop in the adverse scenario with -0.6% of euro area GDP net effect, with relatively substantial -1.6% of the original amplification mechanism, and +1% mitigating impact of COVID-19 policies

Macroprudential stress test 2021-23: main takeaways

- Sound bank solvency and stable profitability outlook in the baseline scenario. 14.4% CET1 ratio in 2023 signifies resilience of the banking sector at its exit from the COVID-19 crisis
- Robust growth of lending to the non-financial in the baseline scenario, 5% annually (on average) in 2021-2023
- The results confirm the role of profit distribution restrictions in preserving bank solvency during the pandemics, and are qualitatively not affected by the gradual phase-in of the Basel III finalization at the end of the horizon
- Loans to the non-financial private sector in the adverse scenario contract by -1% annually (on average) triggering the negative banking sector – real economy feedback loop
- The availability of public guarantees, and maintaining of other COVID-19 mitigation policies in 2021, more than halves the banking sector – real economy amplification

And now a preview of the ECB’s economy-wide climate change stress test…

Three climate scenarios that combine transition and physical risk



Quantitatively, based on **NGFS scenario outputs (phase I)**

Expected impact

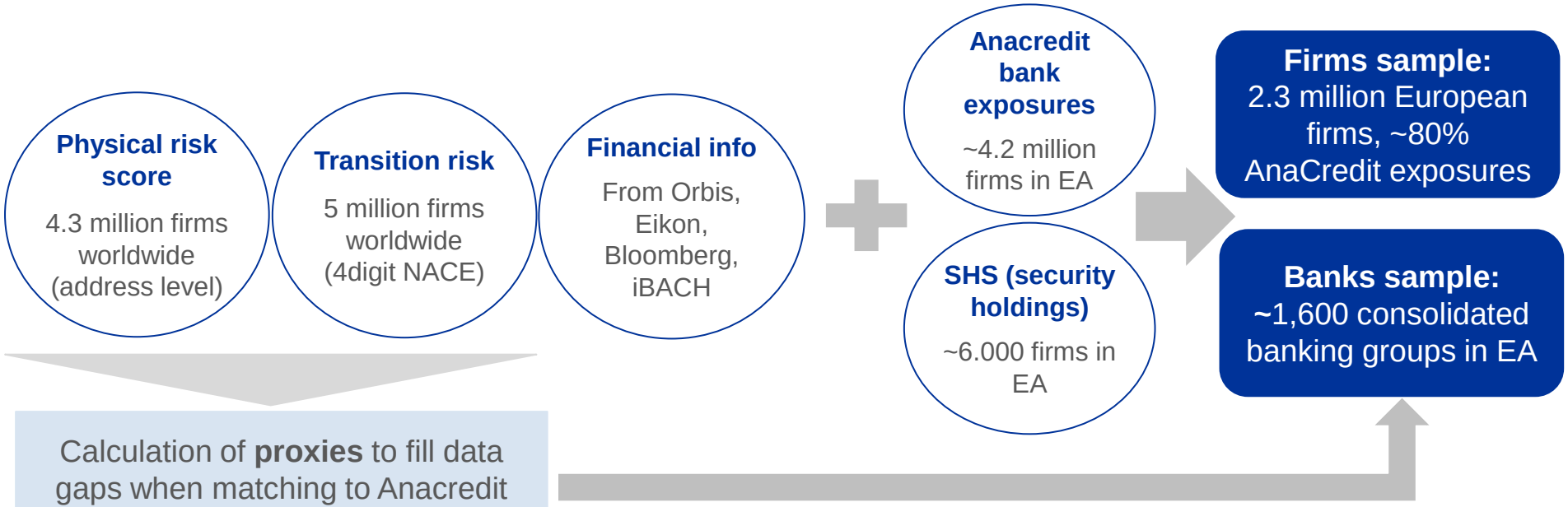
1. Orderly transition with limited physical risk
Early and effectively implemented policies
Limited costs from transition and physical risk

2. Disorderly transition with limited physical risk
Delayed policies implemented
High costs from transition and average costs from physical risk

3. Hot house world with extreme physical risk
No new policies implemented (only current policies)
Very limited costs from transition but extremely high costs from physical risk

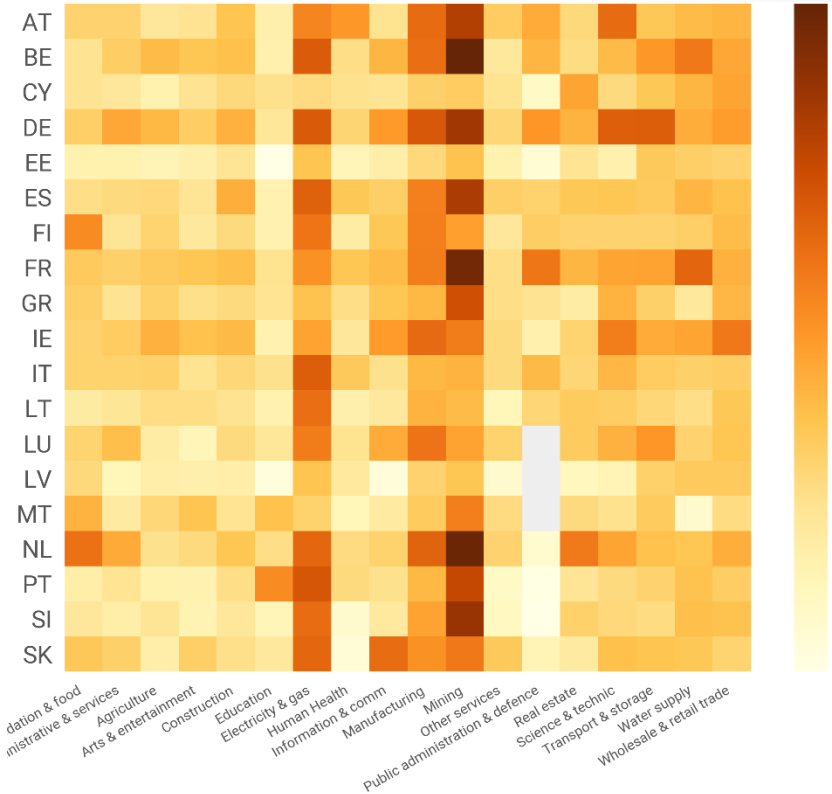
Integrated data infrastructure

Feature 1: *granular climate and financial information for millions of corporates*



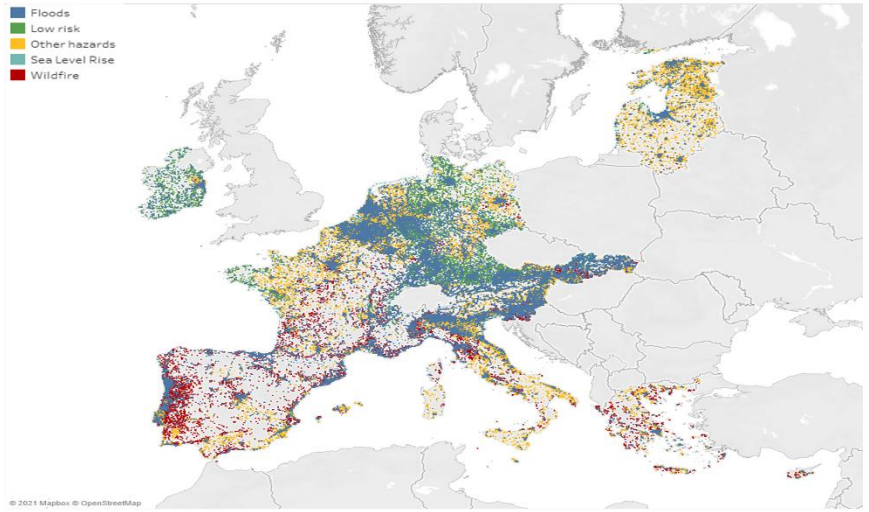
Firms' sample by transition and physical risk

Emissions by country-sector (tCO2e)



Source: ECB calculations on Urgentem data (2018). Coverage of GHG emissions in France is relatively lower due to lack of information on firms' revenues.

Physical risk intensity



Source: ECB calculations on 427 data (physical risk scores are forward looking and reflect intensity and magnitude of natural catastrophes over a 30y horizon). Data are provided at the address level. The regional proxies are based on a sample larger than Anacredit.

- **Highest emitting sectors:** mining, electricity, manufacturing
- Physical risk hazards **heterogeneous across countries**: south more subject to wildfire, north to flood

Novel models to derive counterparty PDs

Feature 2: *new models to capture climate risk transmission channels and damages from natural disasters*

Risk drivers

Transition risk
- Carbon costs
- Technological change and energy efficiency
- Demand for goods

Physical risk
- Damages to physical capital
- Production disruption

Revenues, costs, debt, profits, leverage, PD

Corporates (banks' counterparts)

Credit risk
Market risk

Banks
- Aggregate **default probability** of credit portfolio
- **Losses** from corporate bond repricing

Mitigants: Insurance coverage protects capital from damages

Amplifiers: Insurance costs increase in some vulnerable areas