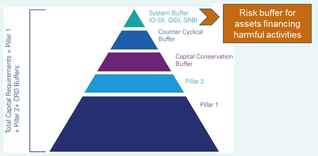
European Commission

Accounting for climate transition risk in banks' capital requirements

Motivation

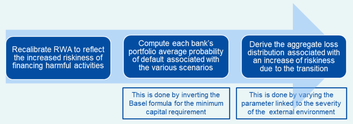


- In the ***Action Plan on Sustainable Growth (2018)***, one of the suggestions is to use **bank capital requirements as a means to promote the transition to a low carbon economy**.
- The new ***Strategy for Financing the Transition to a Sustainable Economy*** (2021) highlights the need to **identify and manage sustainability risks**, including for the financial system as a whole.
- Banks with exposure to **transition risk** (e.g. high-carbon assets) could be required to **hold additional capital**.

- The paper assesses the potential **impact of transition risks** on banks' balance sheets
- It attempts to **calibrate a capital buffer** for carbon-intensive assets that could be put in place as a mitigation measure
- The buffer should reflect the specific **exposure to climate transition risk** of each financial institution/jurisdiction.

General modelling framework

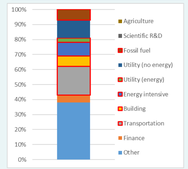
- Starting point: estimates of shares of assets financing **harmful activities**;
- A **micro simulation model** assesses the financial stability impact of **increased risks**. Outcome: estimated distribution of losses that cannot be absorbed by capital and recapitalizations;
- Experiment #1: a banking crisis not triggered by transition risk;
- Experiment #2: a crisis triggered by transition risk, with dynamic balance sheet and amplification mechanism
- Greening as risk mitigant: assume a change in the structure of portfolios with a decrease in transition risk due to the greening of the real economy.



Recalibration of risk weighted assets

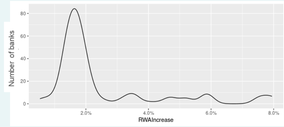
- Sample: 461 EU banks, 2020 balance sheet data
- Estimates of assets shares (bonds, stocks and loans) financing harmful activities (Alessi et al. 2021)
- Recalibration of RWAs to reflect the increased riskiness of financing harmful activities:
  - ✓ 25% increased riskiness for securities and corporate loans;
  - ✓ 15% increased riskiness for mortgages financing energy inefficient buildings.

Banks' exposure to Climate-Policy-Relevant Sectors



Note: the chart refers to corporate loans and securities only.

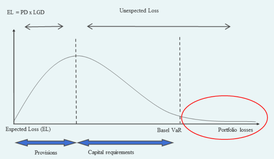
Distribution of increases in RWAs due to exposure to transition risk



Micro simulation model

SYMBOL: micro simulation portfolio model based on bank level data. Monte-Carlo approach where banks fail, depending on their level of capital and RWA, as well as on the severity of the negative shock.

- Use the **Basel II/III FIRB formula** to shape the loss distribution .
- **Capital** provides a **buffer against unexpected losses** at a specific statistical confidence (**99.9%**).
- Extract implied **average riskiness of bank portfolio (IOPD)**.

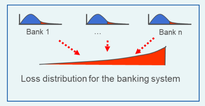


$$L_{h,J} = N\left[\sqrt{(R)} \cdot Z_h + \sqrt{(1-R)} \cdot \frac{N^{-1}(PD_J) - \sqrt{(R)} \cdot Z_h}{\sqrt{(1-R)}}\right]$$

- Known
- Randomly generated

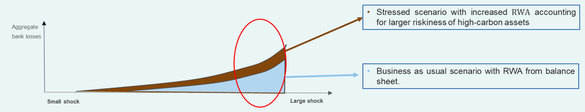
$$N^{-1}(PD_J) = I \cdot Z_I + \sqrt{1-I^2} \times W_{h,J}$$

- Common factor

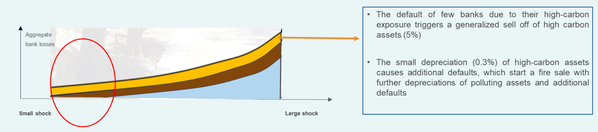


Two types of banking crises

Crisis not triggered by transition risk (i.e. due to a recession)



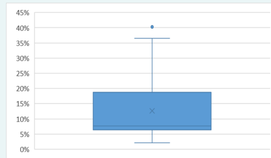
Crisis triggered by climate risk



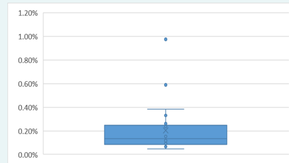
Results – Banking crisis not triggered by transition risk

- Uncovered transition risk leads to **8% higher bank losses** at EU level
- **Heterogeneous results at country level:** very mild impact in some countries, while in five countries the increase in overall losses is around 20%, and up to 40% in one case

Distribution of loss increases (%)



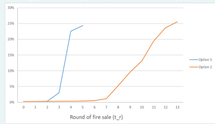
Distribution of losses as share of TA



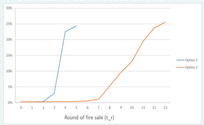
Results - Transition risk as a trigger of a crisis

Evolution of the fire-sale under two alternative depreciation paths

Cumulative share of banks at default

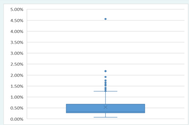


Cumulative bank losses as share of TA



Distribution of bank losses after a fire-sale as share of TA

Distribution of additional capital needs as share of RWAs



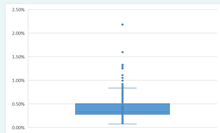
- When transition risks materialize **20% of the banks could fail**, with one or two actually failing in each Monte Carlo iteration;
- The fire-sale stops only after around **25% of the banks fail**.
- **Final losses amount to 1% of total assets**, i.e. around 335-360 bn for the EU banking sector as a whole (3% of GDP, just below global financial crisis).
- An **extra capital buffer of around 0.5% of RWA** on average, or 3% of existing capital, would be sufficient. However, banks where transition risks are concentrated would need to set aside more capital, up to 4.5% of RWA in very extreme cases.

Results – greening

- The reduction in transition-risk exposure takes place as the weight of fossil-fuel and high-carbon activities decreases in the economy as a whole. In turn, financial assets funding companies and activities become also greener.
- **Final losses would be reduced by a factor of 10** compared to today.
- **Additional capital requirements** would be less demanding, i.e. around **0.4% of RWA** on average (or 2% of existing capital), and up to 2% of RWA for the most exposed banks.
- Greening can happen in two alternative ways, notably either by decreasing risk concentration or not: **reducing transition risk where it is concentrated is a more effective strategy to reduce systemic risk.**

Distribution of bank losses after a fire-sale as share of TA

Distribution of additional capital requirements as share of RWAs



Conclusions

- Findings support the idea that banks should be asked to protected themselves against the consequences they might face owing to the economy shifting to low carbon.
- Already today, some banks are at risk of default should transition risk materialize.
- Uncontrolled market dynamics could in principle take place anytime. These could be effectively tackled with the introduction of an extra capital buffer accounting for transition risk.
- Based on a robust calibration, we estimate additional capital needs at 0.5% RWA on average.
- As the economy becomes greener and banks' balance sheets become less exposed to high carbon assets, this capital buffer could be reduced as the risk of a fire sale becomes lower.

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