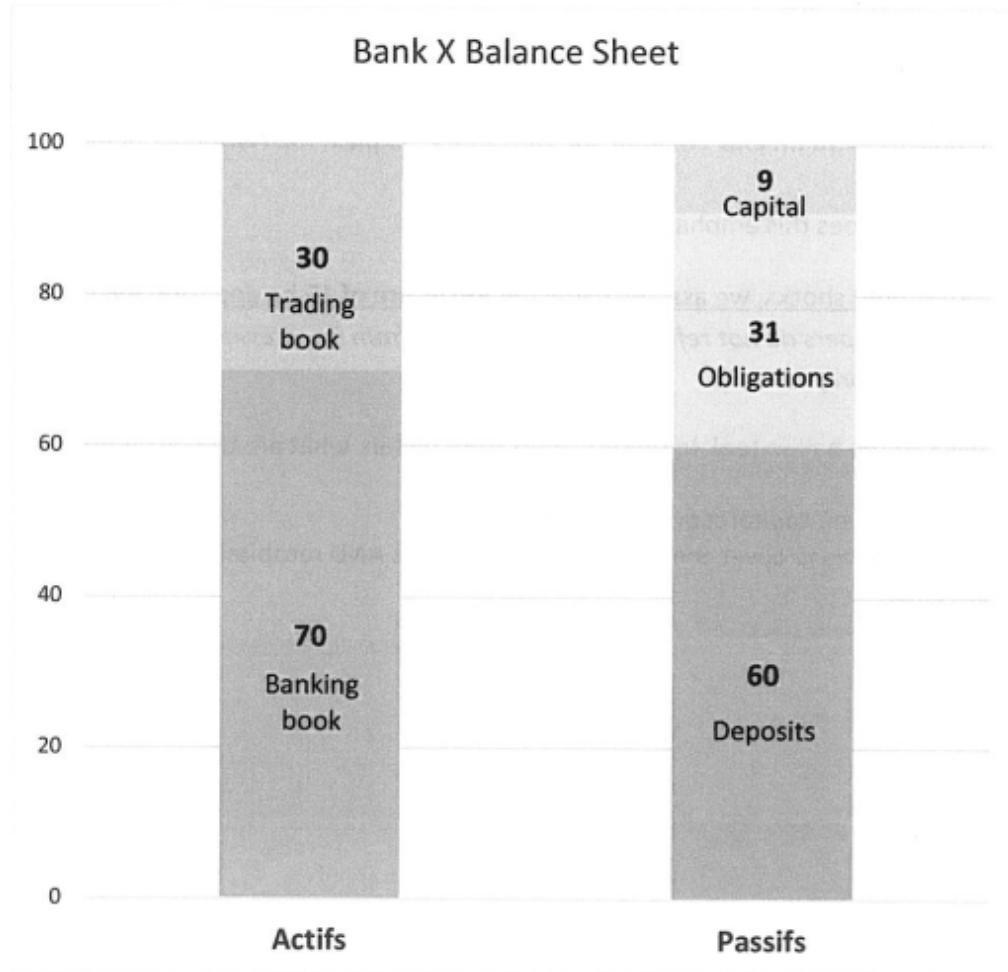


Case study

Capital requirement ratio = 10%.

RWA_{trad} and the initial margin (IM) are 1-day VaR at 95%.



Banking book

The banking book is composed of rated corporate loans with the following exposures:

Corporate loans	Risk weight	Exposure
AAA	20%	10 bn
AA	20%	10 bn
A	50%	10 bn
BBB	100%	10 bn
BB	100%	10 bn
B	150%	10 bn
Junk	150%	10 bn

Trading book

Composed of GDP LIBOR swaps. $\text{RWA}_{trad}(t_0) = 15$.

A. Downgrade event on the entire order book at t_1

1. Banking RWA before and after:

$$\text{RWA}_{bank}(t_0) = \sum \text{Weight} \cdot \text{Exposure} = 10 \text{ bn} \cdot (0.2 + 0.2 + 0.5 + 1 + 1 + 1.5 + 1.5) = 59 \text{ bn}.$$

$$\text{RWA}_{bank}(t_1) = 10 \text{ bn} \cdot (0.2 + 0.5 + 1 + 1 + 1.5 + 1.5 + 1.5) = 72 \text{ bn}.$$

2. Is the bank compliant before / after the event?

Before: required capital = $\text{RWA} = (59 + 15) \cdot 0.1 = 7.4 < 9$ (current capital). **Compliant.**

After: required capital = $\text{RWA} = (72 + 15) \cdot 0.1 = 8.7 < 9$ (current capital). Still **compliant**.

B. Trading book

We assume that the portfolio sensitivities par bps are $\Delta(t_0) = 0.1, \Gamma(t_0) = -0.001$.

Rates are expected to move by $\Delta r = -50$ bps at t_2 .

1. Trading book $\text{RWA} = \Delta \cdot VaR_{95\%}(\Delta r)$. New delta is given by

$$\Delta(t_2) = \Delta(t_0) + \Gamma(t_0) \cdot \Delta r = 0.1 + 0.001 * 50 = 0.15.$$

New trading book RWA :

$$\text{RWA}_{trad}(t_2) = \text{RWA}_{trad}(t_0) \frac{\Delta(t_2)}{\Delta(t_0)} = 1.5 \cdot 15 = 22.5 \text{ bn}.$$

2. After both events, required capital = $0.1 \cdot \text{RWA} = (22.5 + 72) \cdot 0.1 = 9.45 > 9$. The bank is no more CRR compliant, 0.45 bn is missing.

3. We approximate expected losses by the second order Taylor's expansion:

$$\text{Expected losses} = \Delta(t_0) \cdot \Delta r + \frac{1}{2} \Gamma(t_0) (\Delta r)^2 = -50 \cdot 0.1 - 0.5 \cdot 0.001 \cdot 2500 = -6.25 \text{ bn}.$$

- 4.

C. Clearing

1. Extra IM is equal to the change of VaR due to the market move. By the assumption, it is equal to the difference of RWA_{trad} :

$$\text{Extra IM} = VaR(t_2) - VaR(t_0) = 22.5 - 15 = 7.5 \text{ bn}.$$

Extra variation margin is equal to $-PnL = 6.25 \text{ bn}$.

2. It emphasize the procyclicality caused by the clearing process: during the period of market stress and instability more margin should be posted. It stimulates new defaults and amplifies the downward market moves that stimulate even more collateral posting etc., i.e. a positive feedback loop.

D. Resolution

For this question, we assume that **expected losses** are of 15 bn, **total RWA** is 50.

1. Apart from bail-in, possible resolution tools are the following:

- *Sale of business tool*
- *Bridge company*: part or all the entity is transferred to a temporary entity, which is totally or partially publicly owned.
- *Asset separation*: assets, rights or liabilities can be transferred to an asset management vehicle, totally or partially publicly owned.

2. $MREL = 0.2 \cdot RWA = 10 \text{ bn}$ which are separated equally between capital and obligations.

3.
 - To cover the losses (15 bn), the bank should eat all the 9 bn of capital and all the available 5 bn of obligations. It is not enough even to cover the losses.
 - For the recapitalization, after the loss absorption, it needs $0.1 \cdot RWA = 5 \text{ bn}$ to be converted to capital (capital requirement).
 - However, no more bailin-able debts are available as all the 5 bn were absorbed to cover the losses, so they are not enough to cover the losses and recapitalise the bank.
4. SRF can intervene only if not less than 8% of total liabilities has already been made by shareholders, creditors etc. In our case it was only 5 bn = 5% of total liabilities, which is not enough for SRF to intervene.