

The background of the slide is a photograph of a modern building, likely the Brandeis Academic Center, featuring a mix of brick and large glass windows. The image is overlaid with a solid blue color. In the top left corner, the word "Brandeis" is written in a large, white, serif font.

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SCHOOL OF BUSINESS
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SIMPLIFYING BASEL III: ON THE INTERACTIONS BETWEEN CAPITAL AND LIQUIDITY REQUIREMENTS

Simone Casellina, Olli Castrén,
Stephen G. Cecchetti and Anil K Kashyap

Main messages

- Four existing requirements are algebraically identical
 - Capital and liquidity requirements are substitutes
 - One liquidity requirement is enough – the NSFR adds almost nothing
 - Think about capital and liquidity stress tests jointly
- What are the primary risks prudential regulation addresses?
 - Solvency: capital regulation
 - Run: liquidity regulation
 - Fire sale: ???
- Regardless, you do not need 4 requirements to fix 3 problems.
(If you are only trying to address 2 problems, you only need 2 regs)

Some terminology

Assets (Holdings)	Funding (Liabilities + Equity)
Safe Assets	Deposits Bonds
Risky Assets	Equity

Assets:

May lose value (solvency risk)
May be sold to stop runs
May be illiquid (fire-sale risk)

Funding:

Buffer against losses
Vulnerable to runs (run risk)
Buffer to avoid fire sales

Basel III requirements

- Capital: solvency risk
 - Leverage ratio: $\text{Equity} \geq \text{fraction of total assets}$
 - Risk-weighted: $\text{Equity} \geq \text{fraction of "risk-weighted assets"}$
- Liquidity: run risk
 - Liquidity coverage ratio: $\text{High-quality liquid assets} \geq \text{stressed 30-day funding outflow}$
 - Net stable funding ratio: $\text{Stable funding} \geq \text{long-term assets}$

Neither directly addresses fire-sale risk

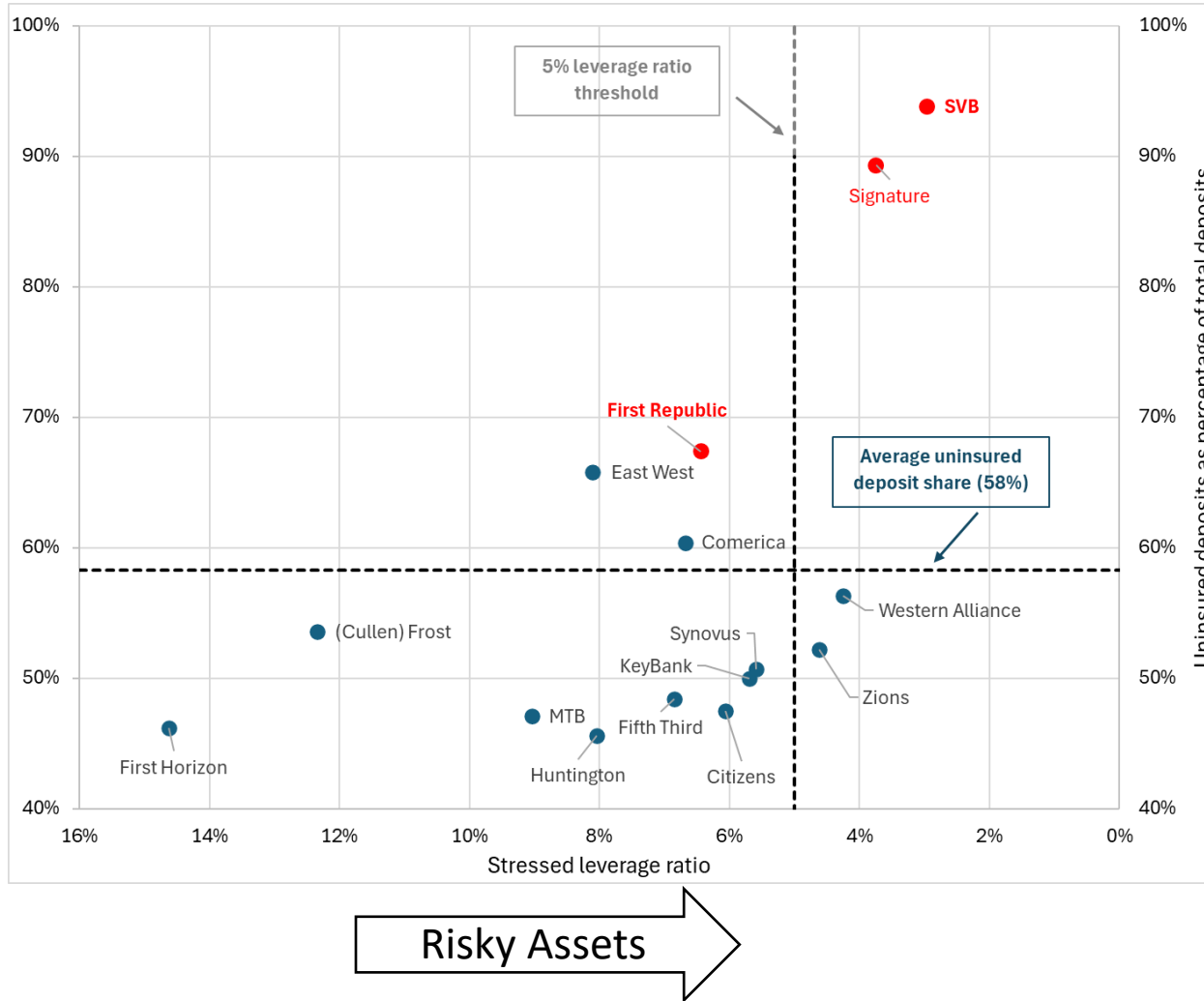
Basel III requirements

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Weighted average of funding $\leq$ or $\geq$ weighted average of assets

(Funding = Deposits + Bonds + Equity)

March 2023: Fatal asset-liability mix



Banks cannot have both

1. Risky assets (solvency)

and

2. Volatile funding (run)

Banks suffering runs in March 2023 had

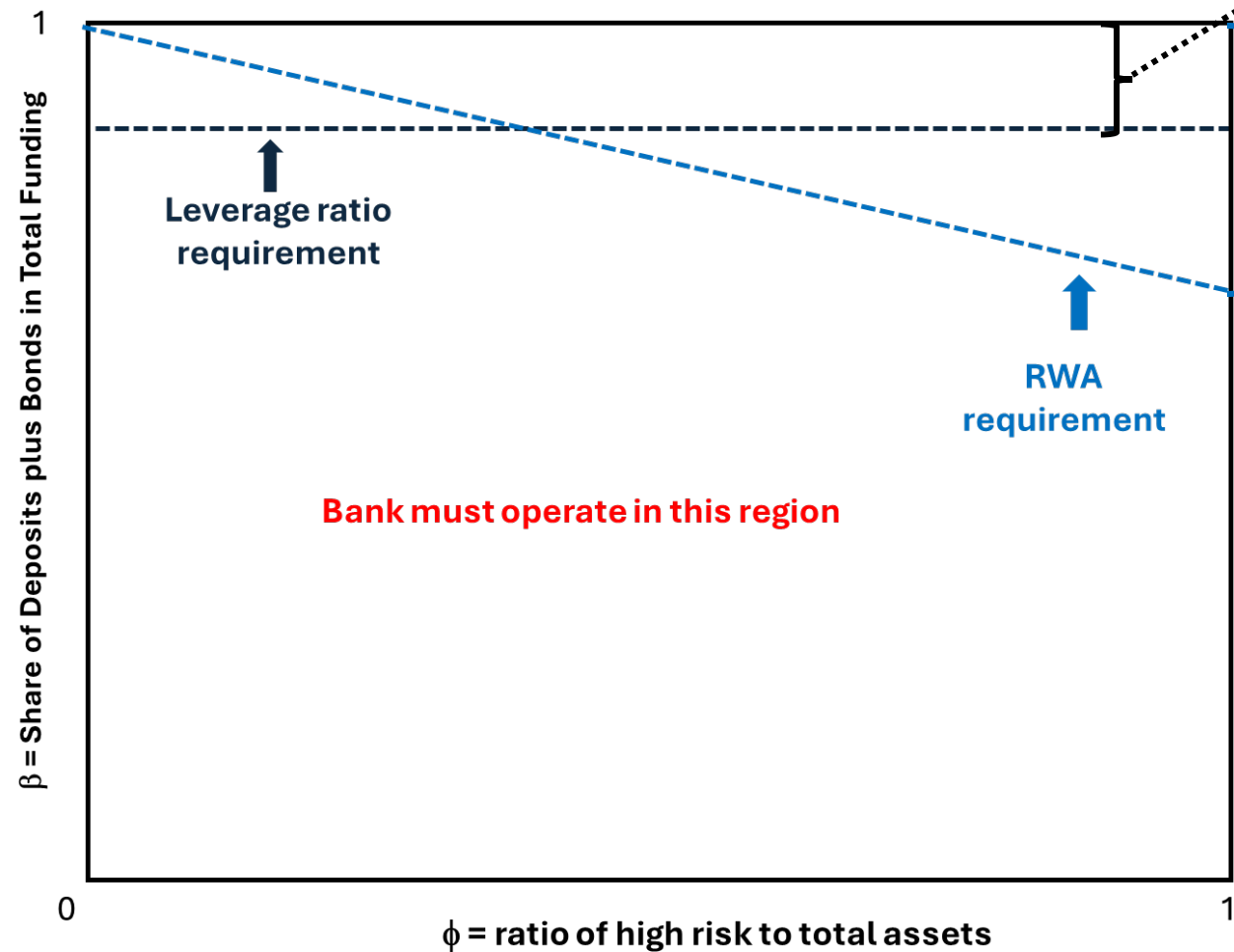
- Less equity/capital funding
- More uninsured deposit funding

Note: Stressed leverage ratio is 5% times end-2023 book value of assets minus the capital shortfall from a 40% global market downturn over a 6-month horizon, all divided by the end-2023 book value of assets.

Capital requirements: solvency risk

- Leverage ratio requirement:
 - $\text{Equity} \geq \text{fraction of total assets}$
 - $\Rightarrow \text{Weighted Average of Funding (Equity)} \geq \text{Weighted Average of Assets}$
 - RWA requirement:
 - $\text{Equity} \geq \text{fraction of risk-weighted assets}$
 - $\Rightarrow \text{Weighted Average of Funding (Equity)} \geq \text{Weighted Average of Assets}$
- (RWA requirement does not capture interest-rate risk & relies on accurate risk weights)

Capital requirements



Leverage ratio requirement:
 $\text{Equity} \geq \text{fraction of total assets}$

RWA ratio requirement:
 $\text{Equity} \geq \text{fraction of risky assets}$

Notation throughout:

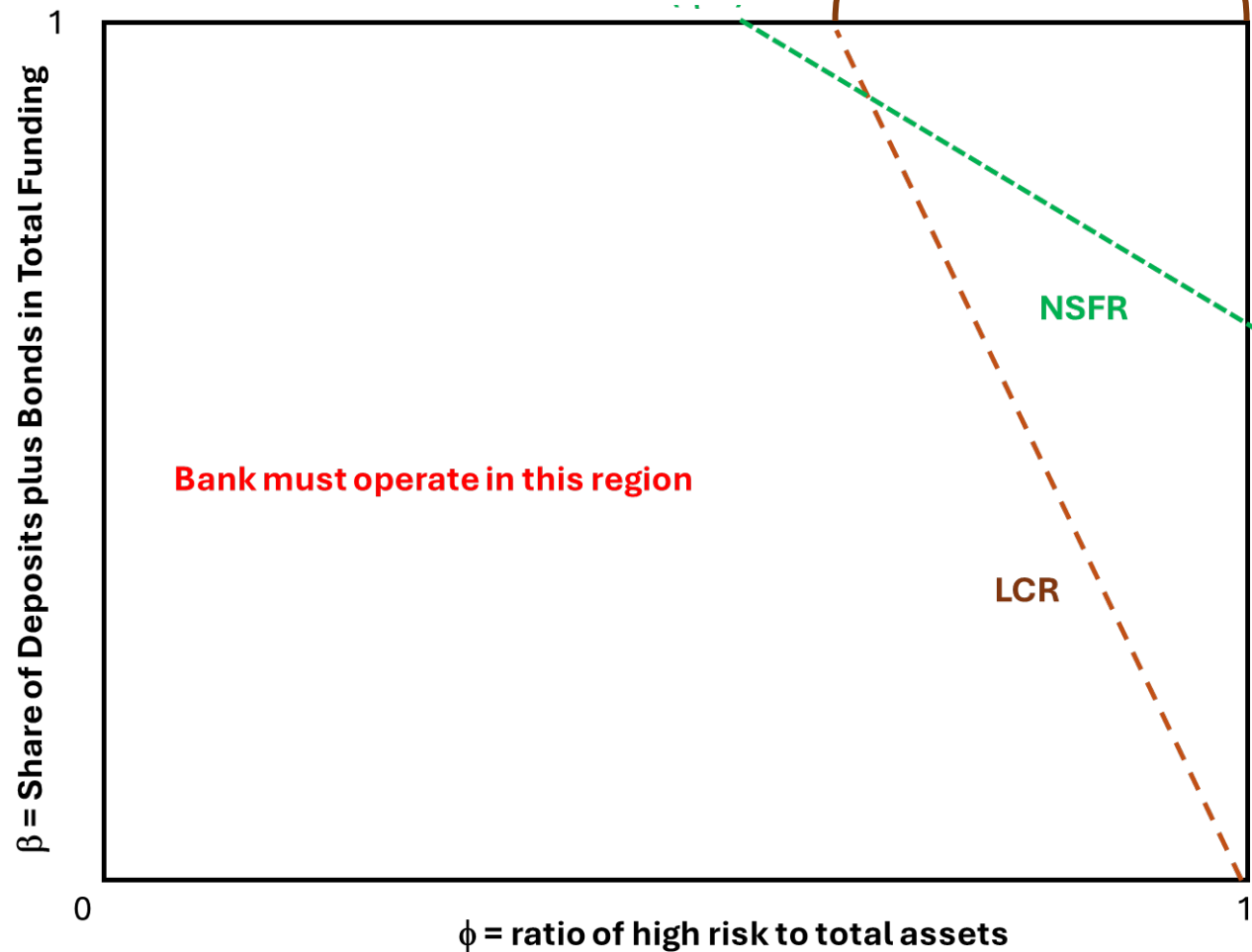
β = Share of deposits + bonds in total funding

ϕ = Ratio of high risk to total assets

Liquidity requirements: run risk

- Net stable funding ratio (NSFR)
 - Stable funding $\geq$ long-term assets
 - Weighted Average of Funding (Available) $\geq$ Weighted Average of Assets (Required)
 $\Rightarrow$ Weighted Average of Funding $\geq$ Weighted Average of Assets
 - Liquidity coverage ratio (LCR)
 - Stressed 30-day outflow $\leq$ high-quality liquid assets
 - Weighted Average of Funding (Outflows) $\leq$ Weighted Average of Assets (HQLA)
 - Using Assets = Funding (Liabilities + Equity): non-Outflows $\geq$ non-HQLA
 $\Rightarrow$ Weighted Average of Funding (non-Outflows)
 $\geq$ Weighted Average of Assets (non-HQLA)
- (By stopping at 30 days, the LCR does not subsume the NSFR entirely)

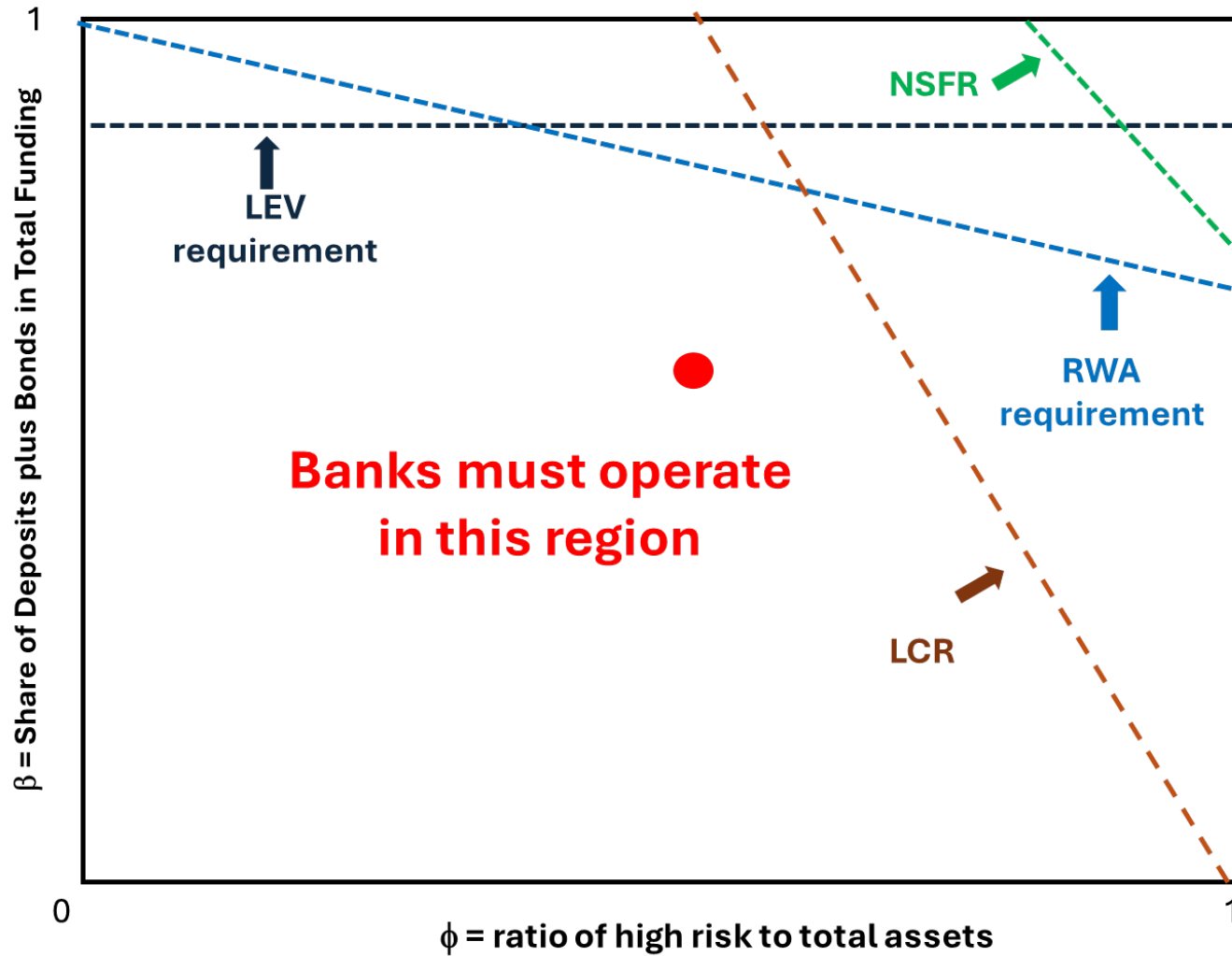
Liquidity requirements



LCR: Safe/HQLA Assets
 $\geq$ Runnable/Deposit Liabilities

NSFR: Stable/Equity Funding
 $\geq$ Long-term/High-risk Assets

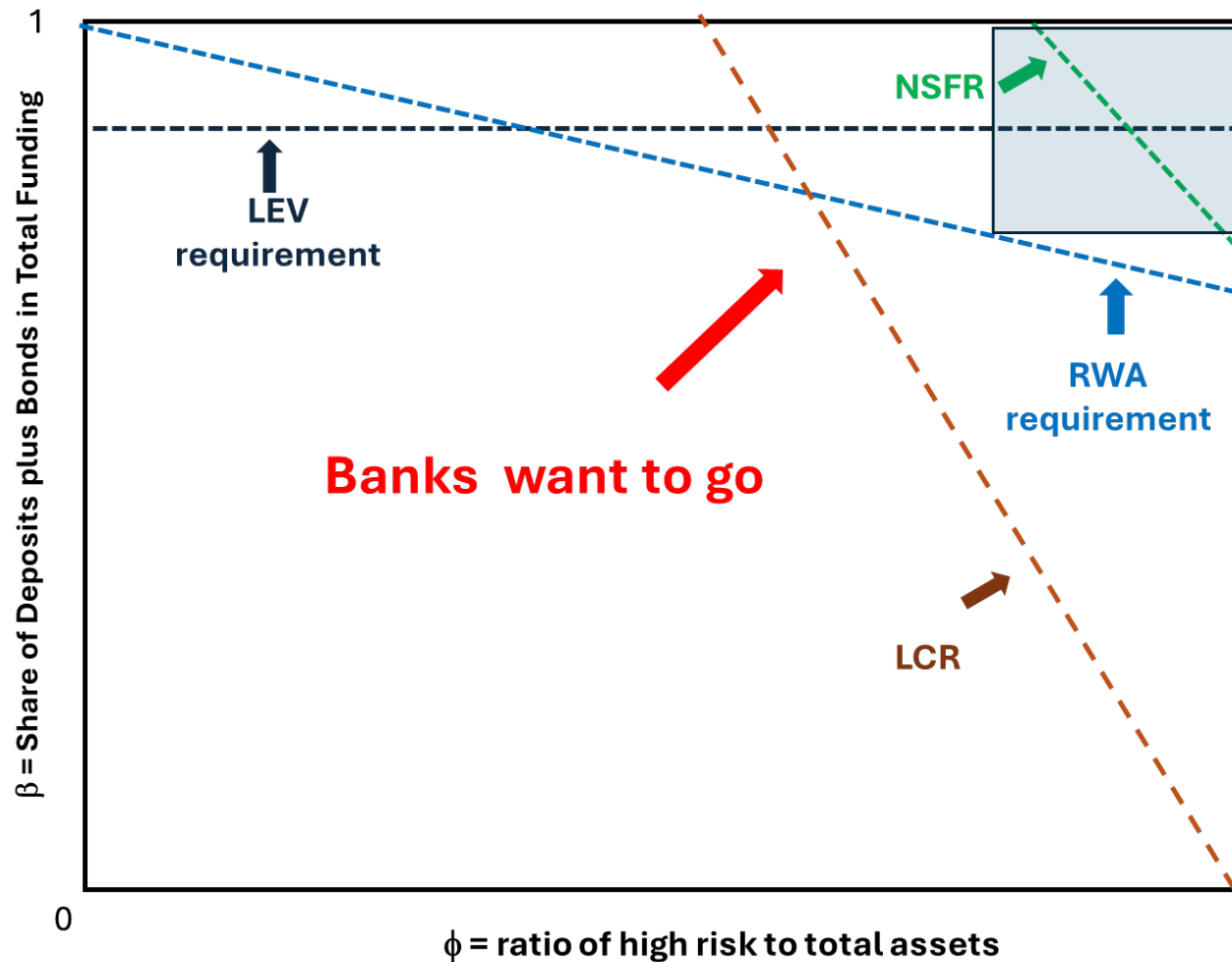
A unified summary of capital and liquidity requirements



Is the 2-D model too simple? No

- Parameters are share-weighted averages of granular assets and liabilities
- Changes in asset-liability mix move the lines on the chart

Banks raise profits by moving up and to the right



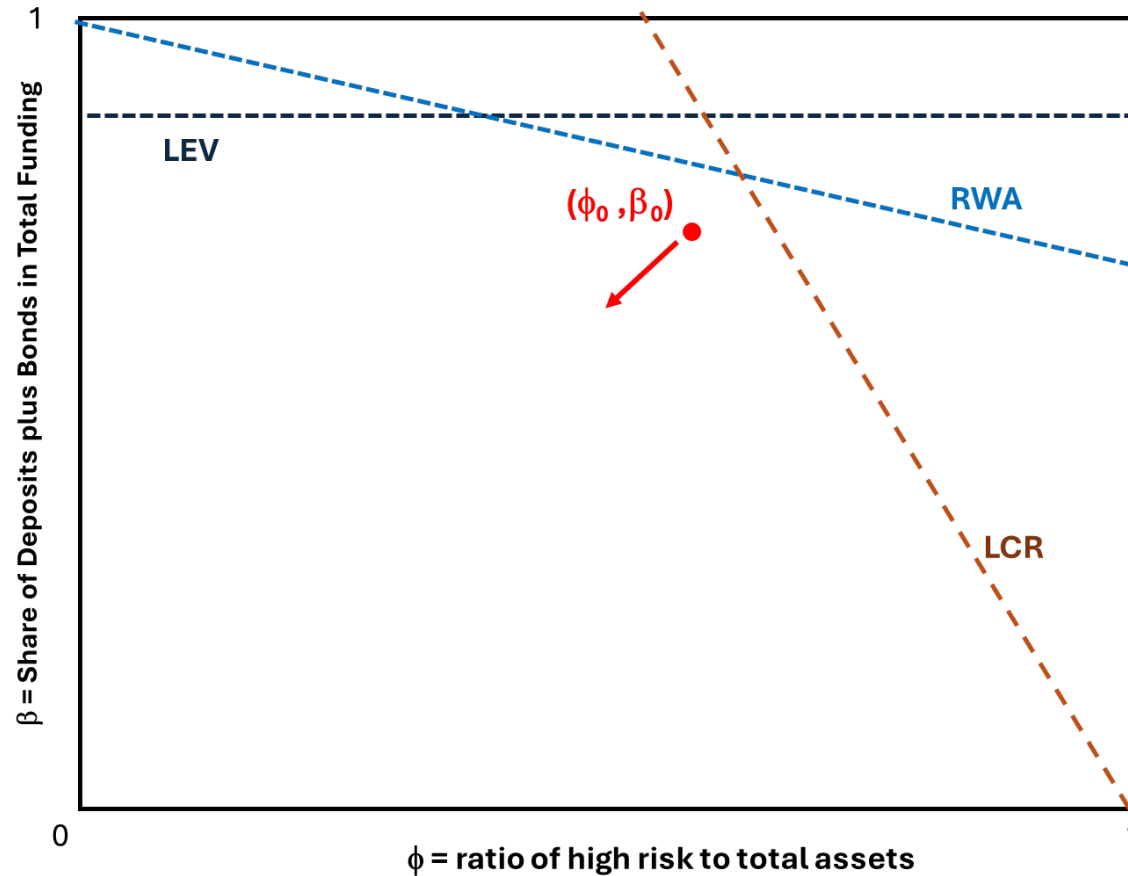
High-risk assets have higher returns

Runnable liabilities have lower cost

Goal of regulation:

Keep banks out of the upper right!

Capital and liquidity requirements are **substitutes**

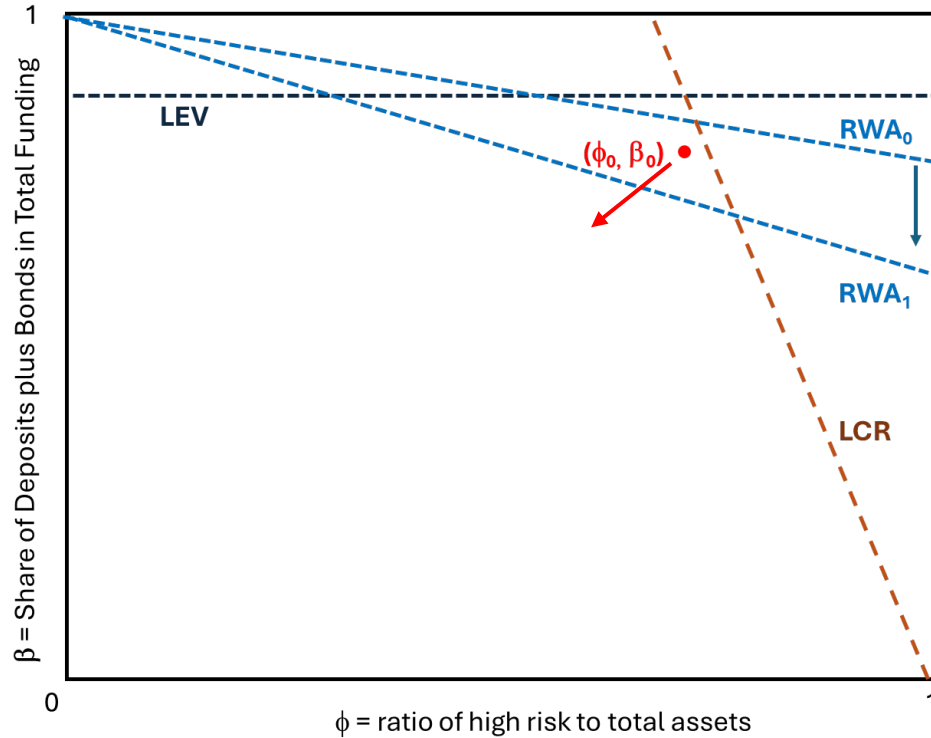


How can regulators force this bank to become more prudent?

How can regulators move the bank down and to the left?

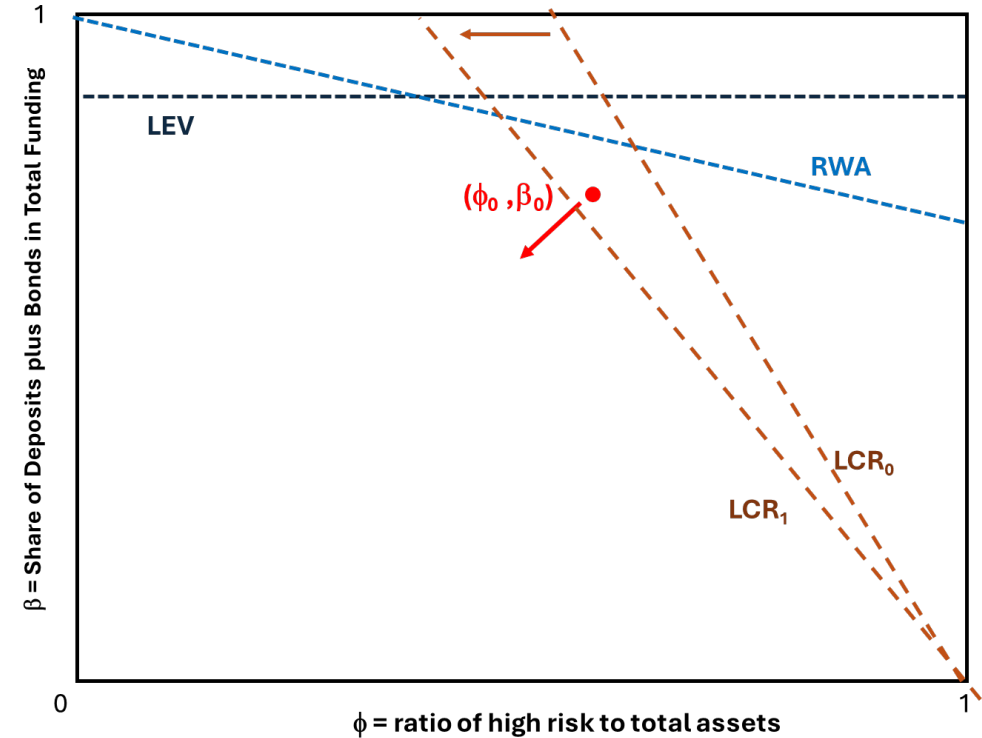
Capital and liquidity requirements are substitutes

1) Raise RWA requirements



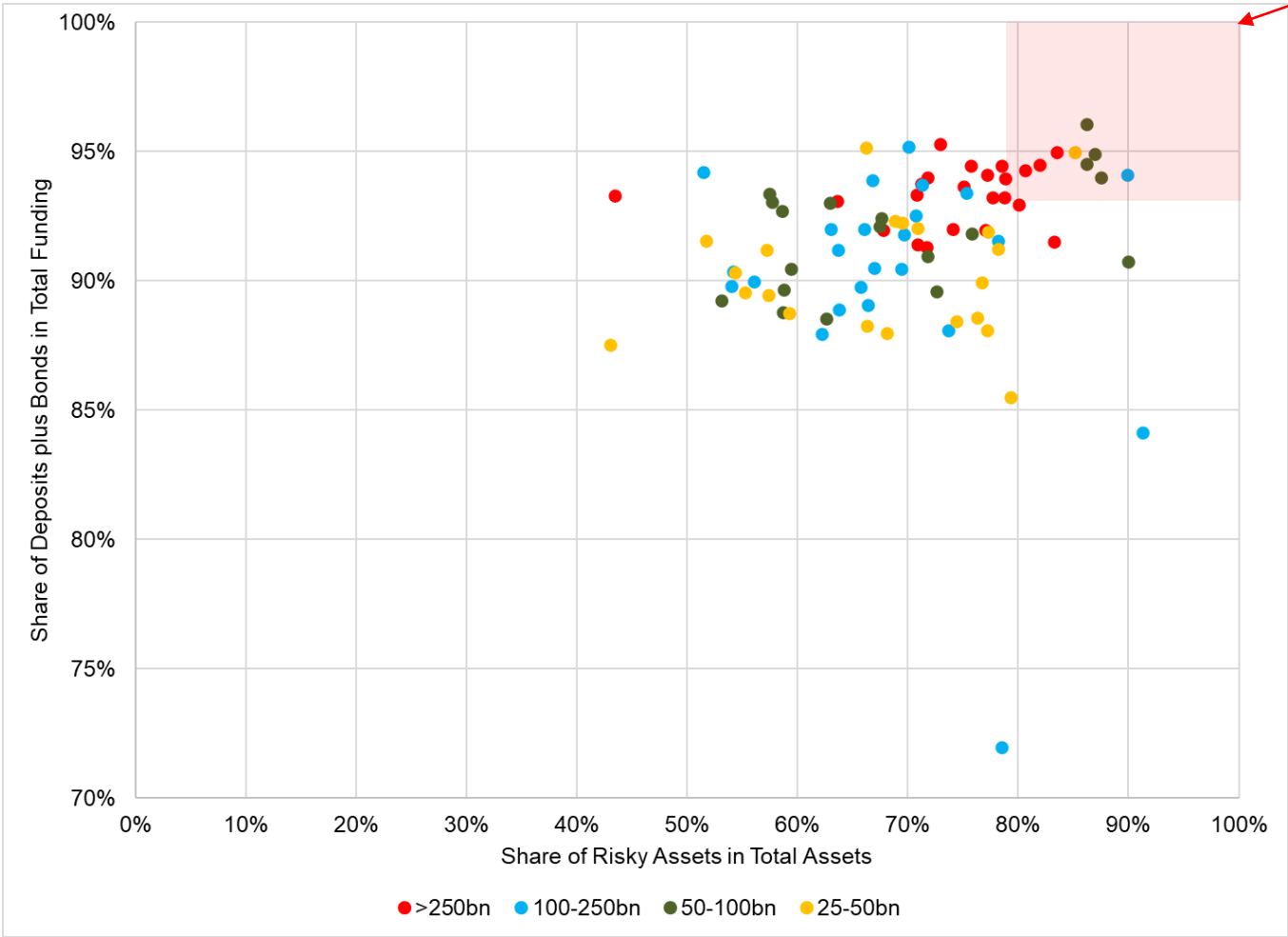
OR

2) Tighten the LCR



The NSFR plays no role here – only RWA and LCR cause banks to move.

Some data

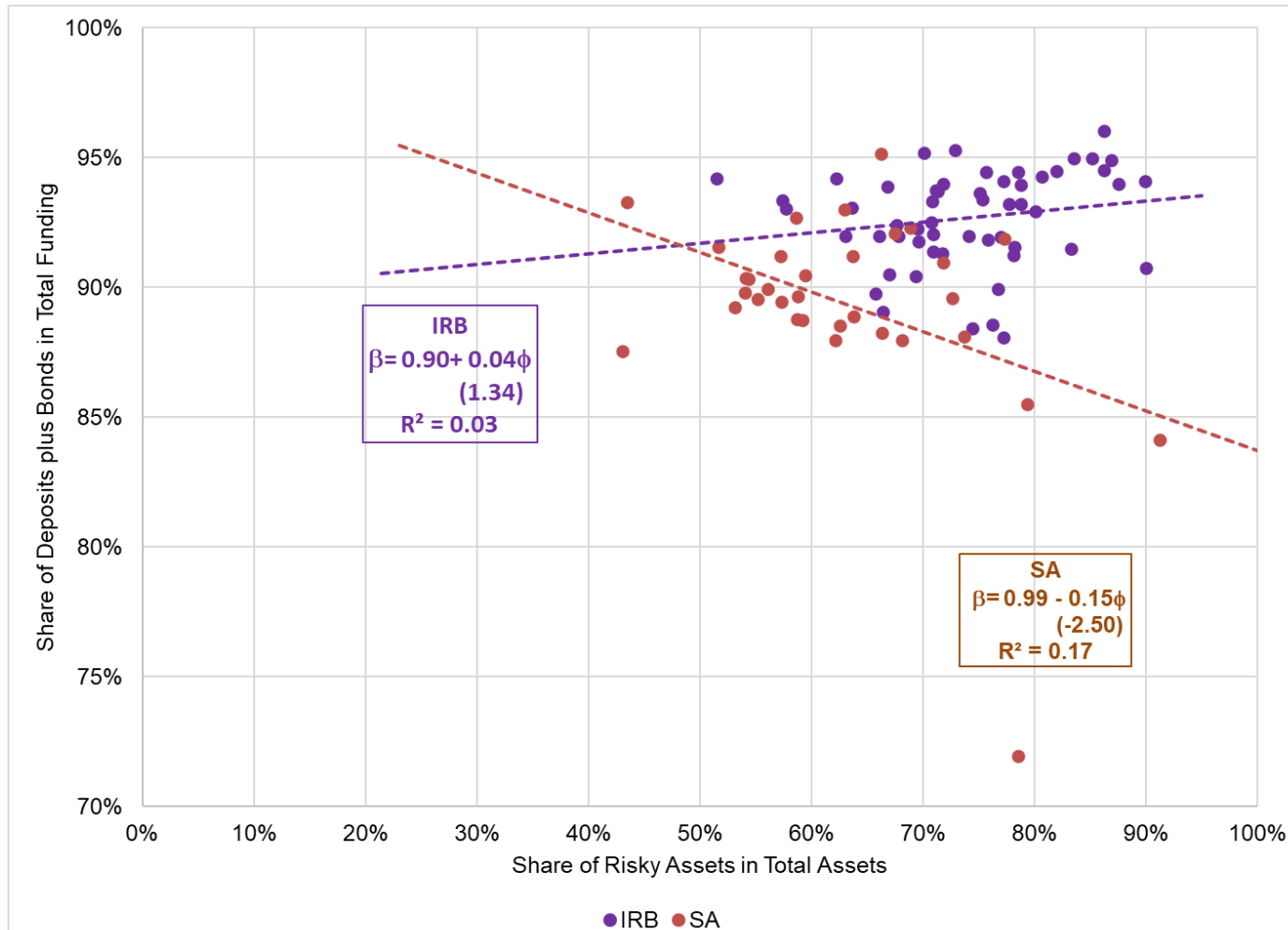


Addressing solvency & run risk means keeping banks out of this region.

87 largest EU banks,
end-2024

Assets = €25 trillion
(92% of total)

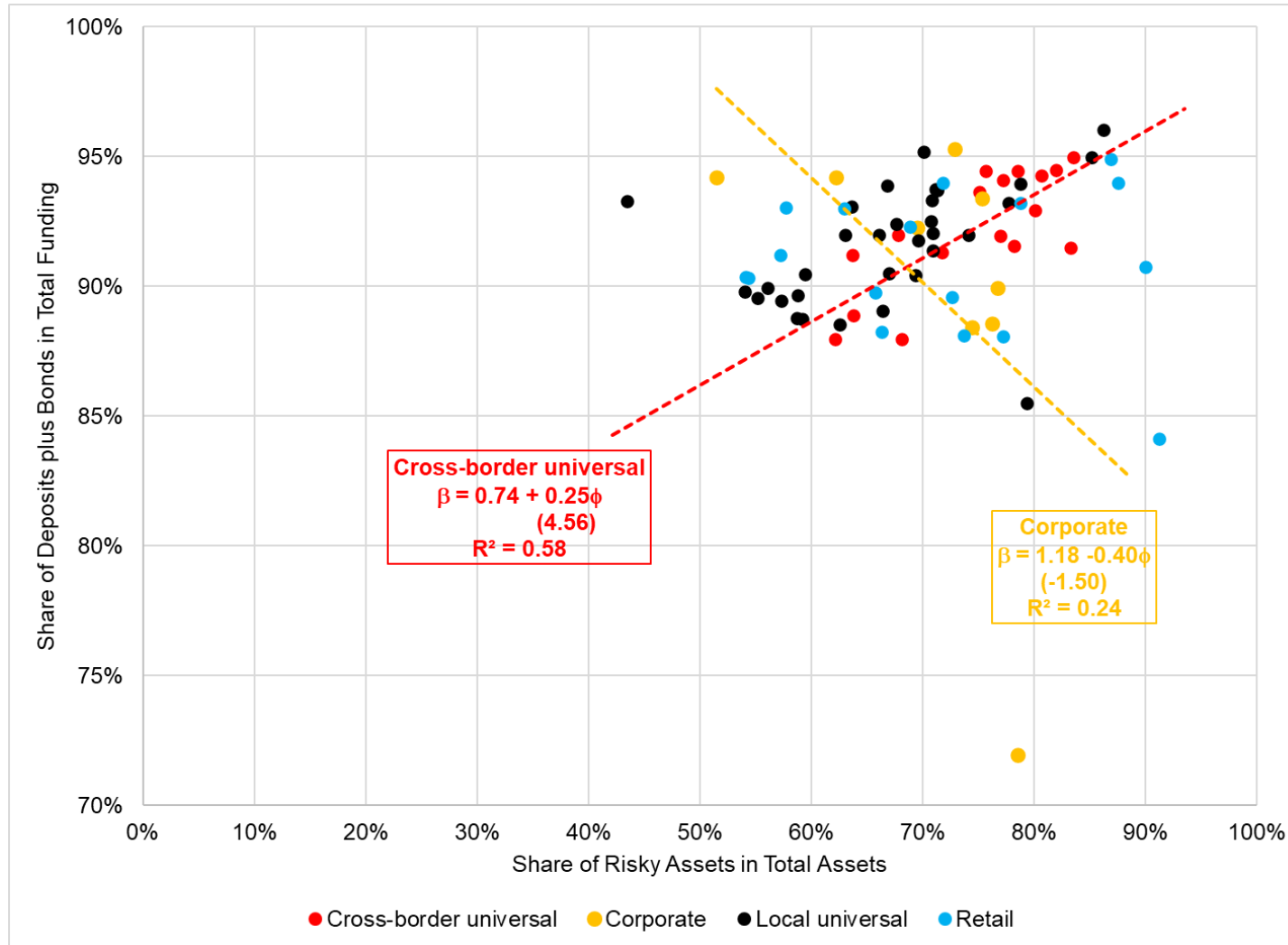
Banks by risk-weighting approach



IRB banks:
weak relationship between
riskiness and capital

SA banks:
higher capital goes along
with riskier assets

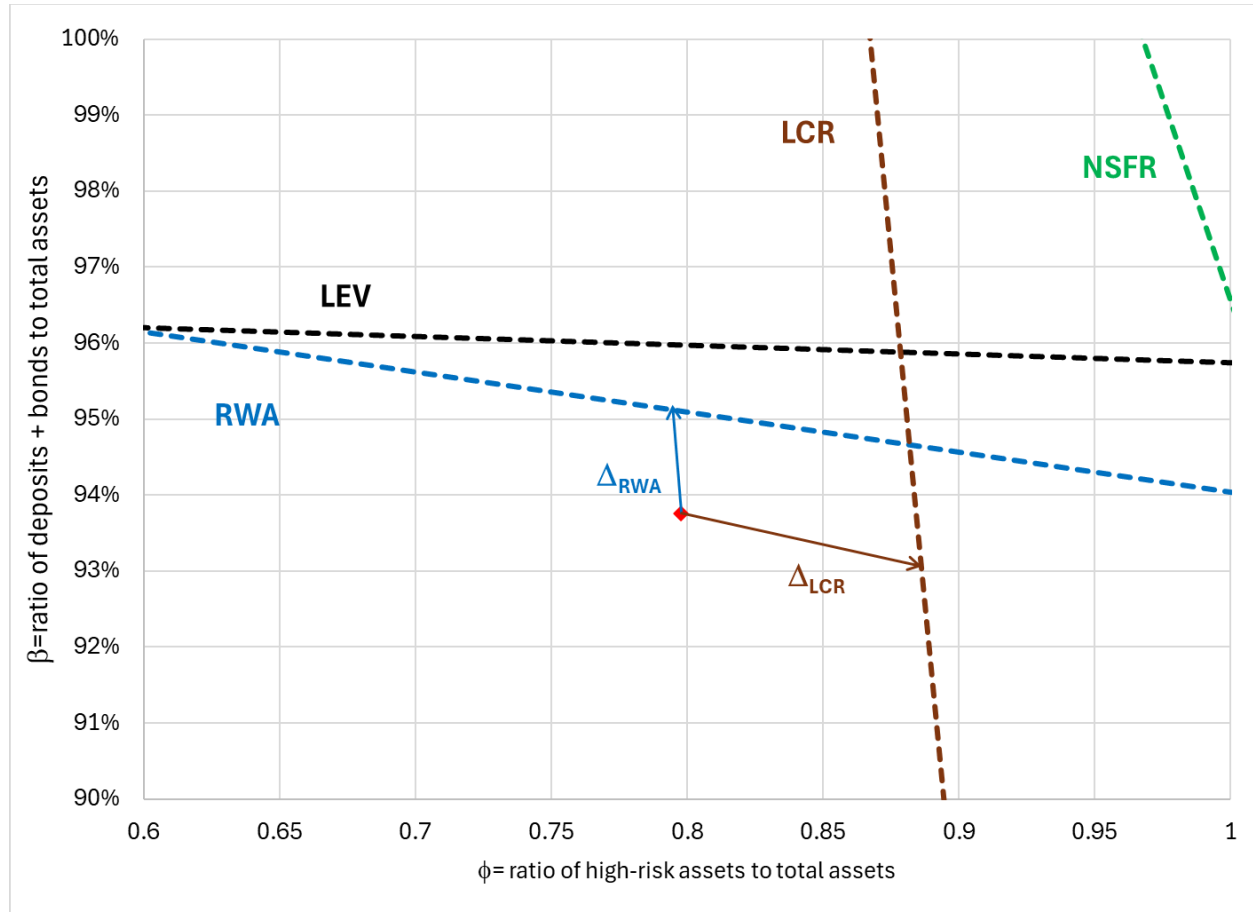
Banks by business model



Cross-border universal banks:
Riskier assets – lower capital
($R^2=0.58$, strong)

Corporate banks:
Riskier assets – higher capital
($R^2=0.24$, weaker)

Traditional stress tests



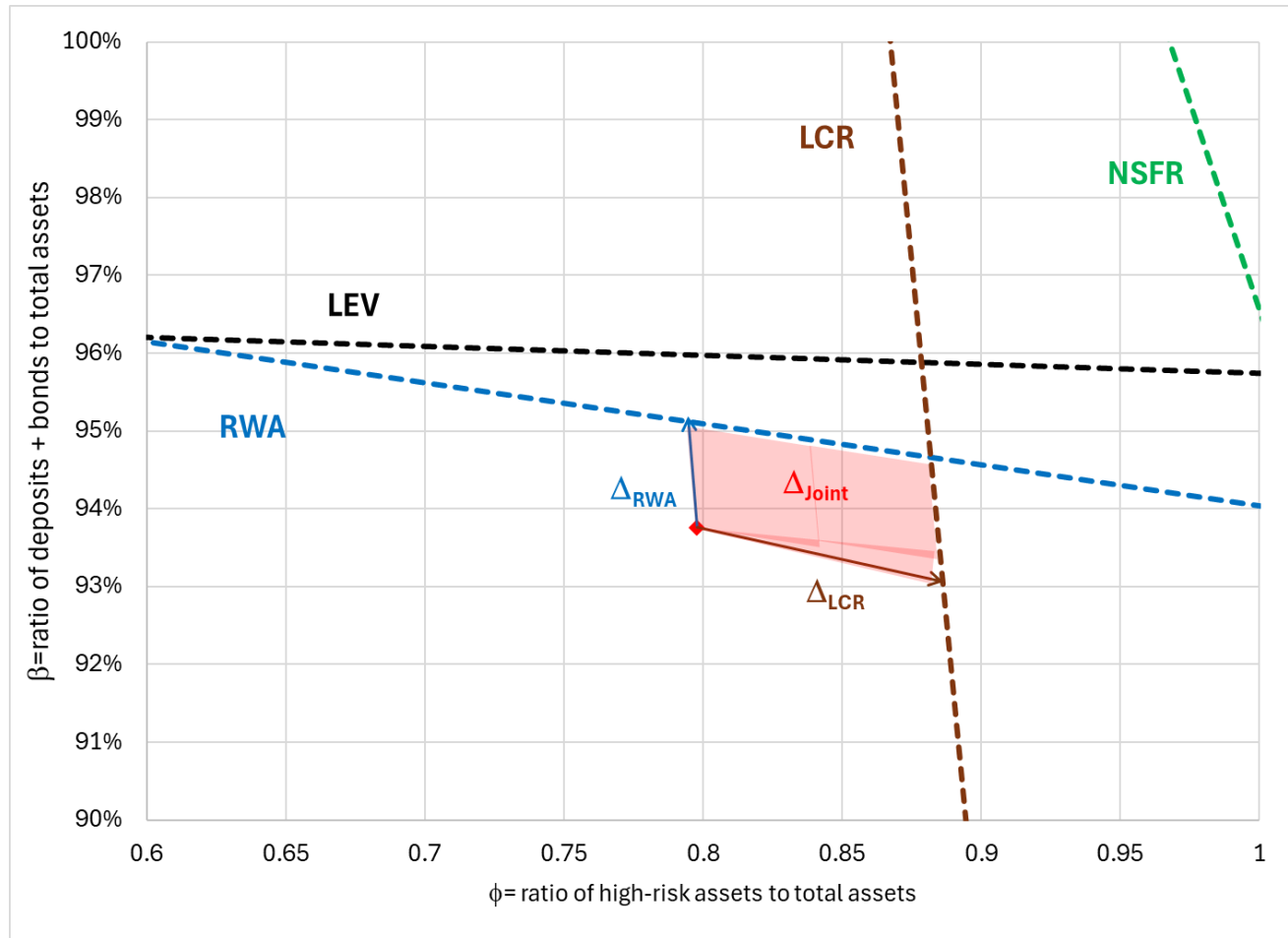
Traditional capital stress test (Δ_{RWA}):
How big a loss can a bank sustain and still meet the RWA (or LEV)?

Traditional liquidity stress test (Δ_{LCR}):
How big a withdrawal can a bank sustain and still meet the LCR?

Traditional stress tests

- Capital stress test (Δ_{RWA} or Δ_{LEV})
 - 70 of 87 banks hit the RWA first
 - 17 of 87 banks hit the LEV first
 - Median sustainable loss = 2.5 pp of total assets
- Liquidity stress test (Δ_{LCR} or Δ_{NSFR})
 - 77 of 87 banks hit the LCR first
 - 10 of 87 banks hit the NSFR first
 - Median sustainable withdrawal = 10.2 pp of total funding

Composite stress test



Banks can withstand any combined loss/withdrawal in the shaded area.

Max is where RWA & LCR cross.

Implications:

Larger sustainable capital loss

Smaller sustainable withdrawal

Conclusions

- Capital and liquidity requirements are algebraically the same
(they are all based on the same inequality)
- RWA and LCR are substitutes; NSFR is redundant
(a small change in the LCR eliminates the need for the NSFR entirely)
- Stress test capital and liquidity jointly
(individual stress tests under- or over-estimate resilience)

Starting over: Basel IV

- Design regulations to explicitly target
 - Solvency risk – address both credit risk and interest rate risk
 - Run risk – deter runs and help with survival
 - Fire-sale risk – new tool that is integrated with LOLR
- How does on- and off-balance sheet structure contribute to each risk?
- Tinbergen principle: 3 regulations to address 3 risks

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