International Actuarial Association
Association Actuarielle Internationale

Banking Resilience Risk Management

Recovery & Resolution Planning

Banking Virtual Forum

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20 March 2024

Agenda

Context

Foundations of Recovery & Resolution Planning (RRP)

Valuation in Resolution (ViR)

Future Direction of RRP

Opportunities for Actuaries in Banking

Questions & Answers

Context

Context – Why resilience risk management?
Foundations of RRP
Valuation in Resolution (ViR)
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Question & Answers

Approach to banking supervision

Bank of England PRA

The Prudential Regulation Authority's approach to banking supervision

July 2023

Firm failure

18. The Act is explicit that it is not our role to ensure that no firm fails. Therefore, a key principle underlying our approach is that we do not seek to operate a zero-failure regime. We work with the Bank as the UK's resolution authority to ensure that any firms that fail do so in an orderly manner.

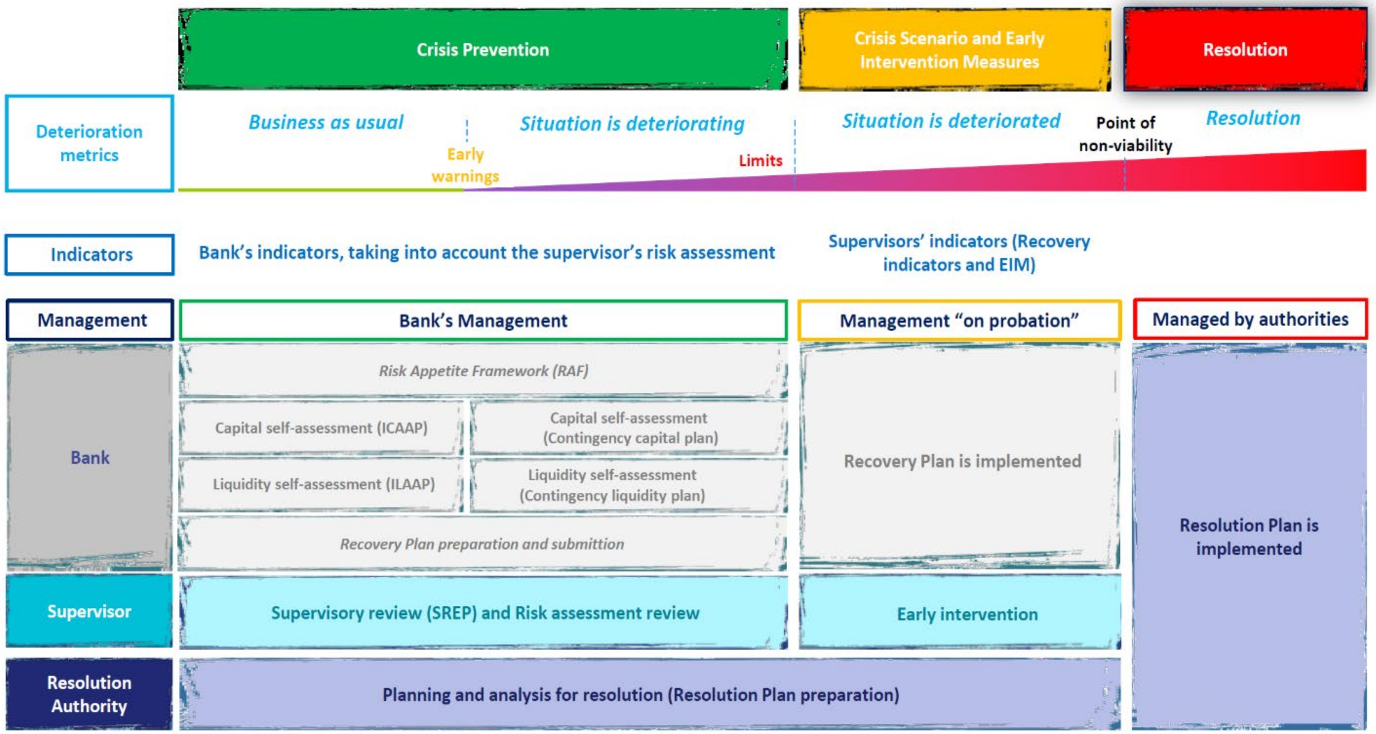
19. Prudential regulation is necessary to address the risks that firms can pose more widely to the stability of the system. The failure of deposit-takers can disrupt the payment system and so depositors' ability to undertake economic activity. And some of the lending provided by banks (for example to small and medium-sized companies) may be difficult to substitute via the capital markets, meaning that bank failures or financial weakness can severely affect the supply of credit to the economy as a whole. Considering the impact of firm failure, and acting pre-emptively to ensure either recovery or orderly resolution is a core aspect of our supervisory approach, and we work to deliver this with the rest of the Bank through our supervisory strategy for individual firms. Our ability to ensure firm failure is orderly depends on both the efficacy of the UK's statutory resolution regime and ensuring firms are structured, and operate, in a way that is compatible with the Bank's preferred resolution strategy under UK resolution powers.

20. The Bank as resolution authority sets the preferred resolution strategy for all firms. The Bank works with firms to ensure that any impediments to an orderly resolution are addressed. Resolvability assessments, and the actions flowing from them, form a key part of resolution planning on a 'business–as-usual' basis before an institution actually encounters distress. This includes engagement with the Financial Services Compensation Scheme (FSCS) depositor protection scheme which protects eligible depositors, up to certain limits, in the event of firm failure where relevant.

4 DP1/21 – A strong and simple prudential framework for non-systemic banks and building societies; available at www.bankofengland.co.uk/prudential-regulation/publication/2021/april/strong-and-simple-framework-banks.
CP5/22 – The Strong and Simple Framework: a definition of a Simpler-regime Firm; available at www.bankofengland.co.uk/prudential-regulation/publication/2022/april/definition-of-a-simpler-

Source: https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/approach/banking-approach-2023.pdf

Stress continuum



Source: *Early Intervention Measures and SREP in Light of Bank Resolution: The role of supervision in bank resolution, practical experience from the assessment of recovery planning*, World Bank, 2020

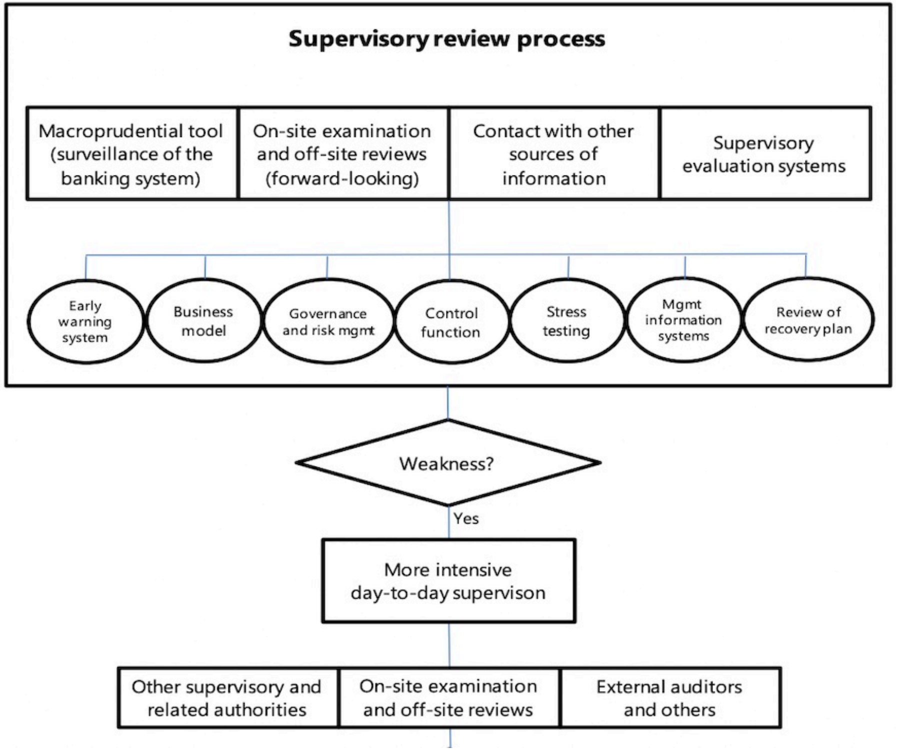
Identification & Intervention

Basel Committee
on Banking Supervision

Guidelines for
identifying and dealing
with weak banks

July 2015

I. Identifying weak banks



Source: https://www.bis.org/bcbs/publ/d330.pdf

Identification & **Intervention**

Figure 6. Banking risk categories

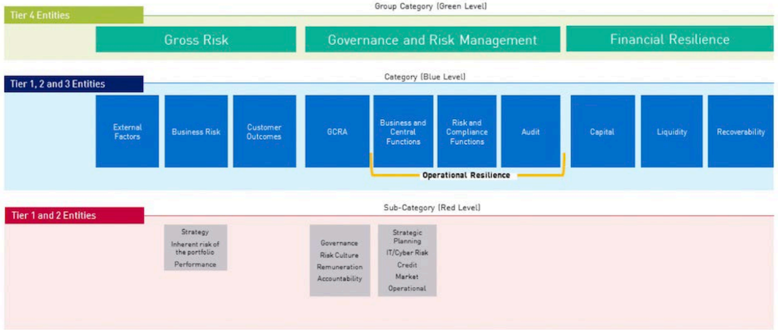
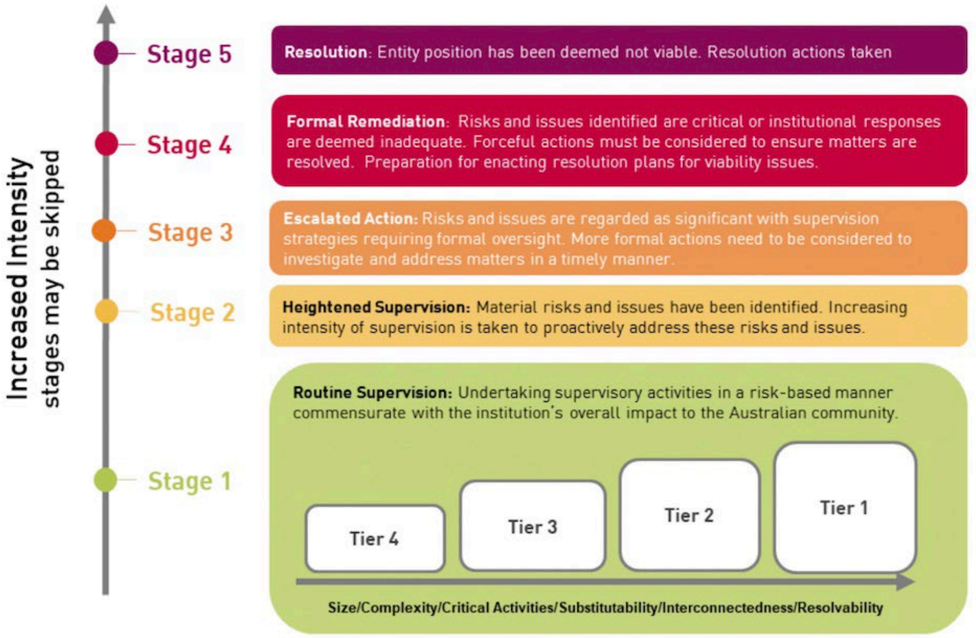


Figure 5. Supervision intensity



Source: https://www.apra.gov.au/supervision-risk-and-intensity-sri-model

Failure still occurs

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Finance

Swiss financial watchdog calls for stronger powers after Credit Suisse crash

By John Revill and Noele Illien

December 19, 2023 6:18 PM GMT+7 · Updated 2 months ago

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Silicon Valley Bank

This article is more than 10 months old

Explainer

Why did the $212bn tech-lender Silicon Valley bank abruptly collapse?

Was it the result of Trump-era regulation rollbacks, risk mismanagement at the bank, sharp interest rate rises - or a combination of all three?

Edward Helmore

Fri 17 Mar 2023 15.14 GMT

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Source: https://www.reuters.com/business/finance/swiss-financial-watchdog-calls-more-powers-after-credit-suisse-crash-2023-12-19/

Source: https://www.theguardian.com/business/2023/mar/17/why-silicon-valley-bank-collapsed-svb-fail

Foundations of RRP

Context

Foundations of RRP – Building blocks

Valuation in Resolution (ViR)

Future Direction of RRP

Opportunities for Actuaries in Banking

Questions & Answers

Recovery Planning: logical building blocks

Governance & Senior Manager Accountability

Strategic Analysis

1. *Critical Services*
   - Deposit taking
   - Loan & Loan Equivalents
   - Wholesale markets
   - Clearing, Settlements, Payments & Custody
   - Capital markets
2. *Critical Functions*
   - Risk
   - Finance
   - Treasury
   - Technology
   - Operations

Scenario Narrative

- **Indicators / Thresholds**
- **Recovery Options**
- **Recovery Capacity**

Communication & Disclosures

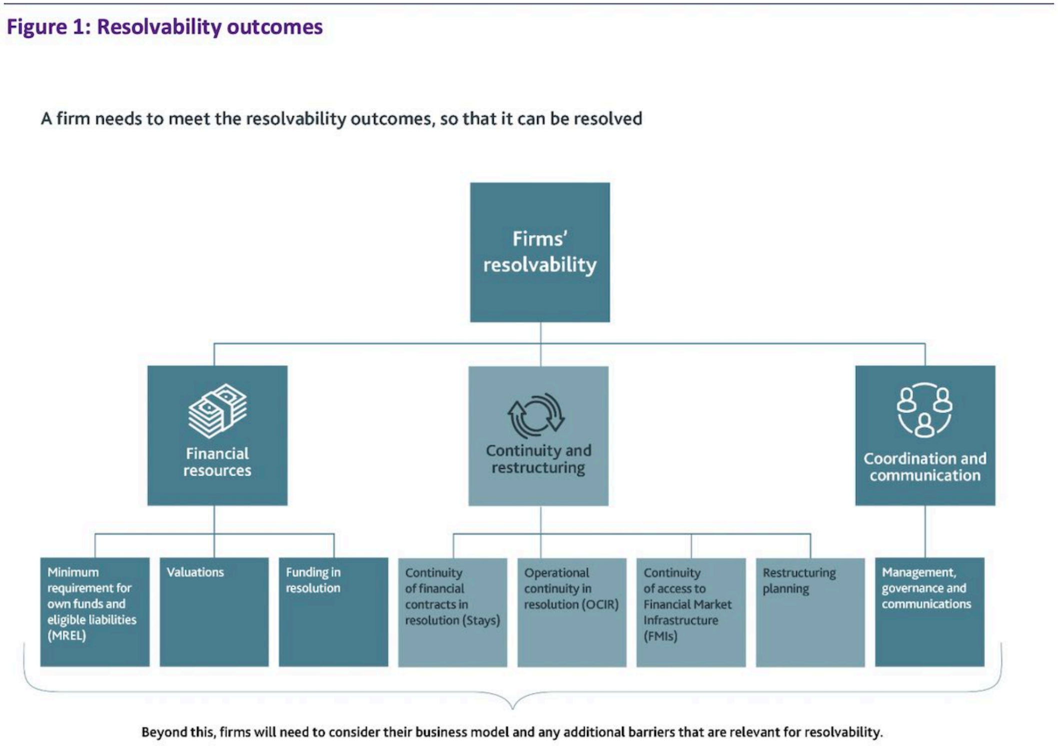
- Prudential regulator
- Capital markets
- External rating agencies
- Depositors
- Employees
- Service providers

Firedrills & Preparatory Measures

MIS / BCBS 239: Risk Data Aggregation & Risk Reporting (Critical Data Elements)

Source: https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/supervisory-statement/2022/april/ss917-may-2022.pdf (Section 2.0)

Bank of England's (BoE's): Resolvability Assessment Framework (RAF)



Objectives:

1. Protect the tax payer from state funded bailouts
2. Preserve critical functions & services during resolution
3. Prevent contagion spreading within the financial sector

Source: https://www.bankofengland.co.uk/paper/2019/the-boes-approach-to-assessing-resolvability

Valuation in Resolution

Context – Why Recovery & Resolution Planning (RRP)?
Foundations of RRP
Valuation in Resolution (ViR) – Asset and liability valuation
Future Direction of RRP
Opportunities for Actuaries in Banking
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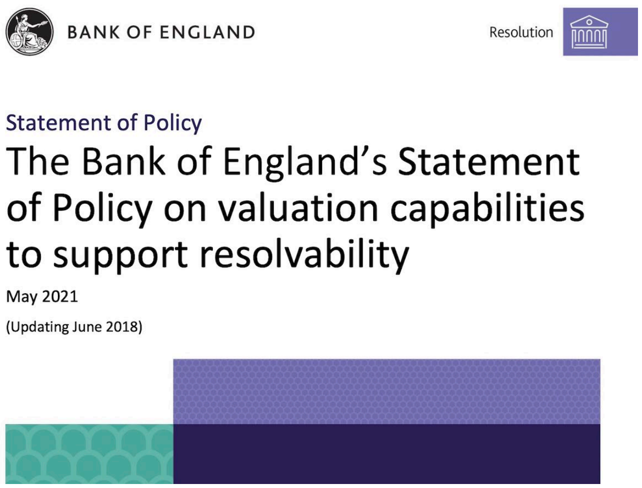
Overview: BoE ViR statement of principles



BANK OF ENGLAND

Resolution

Statement of Policy

The Bank of England's Statement of Policy on valuation capabilities to support resolvability

May 2021

(Updating June 2018)

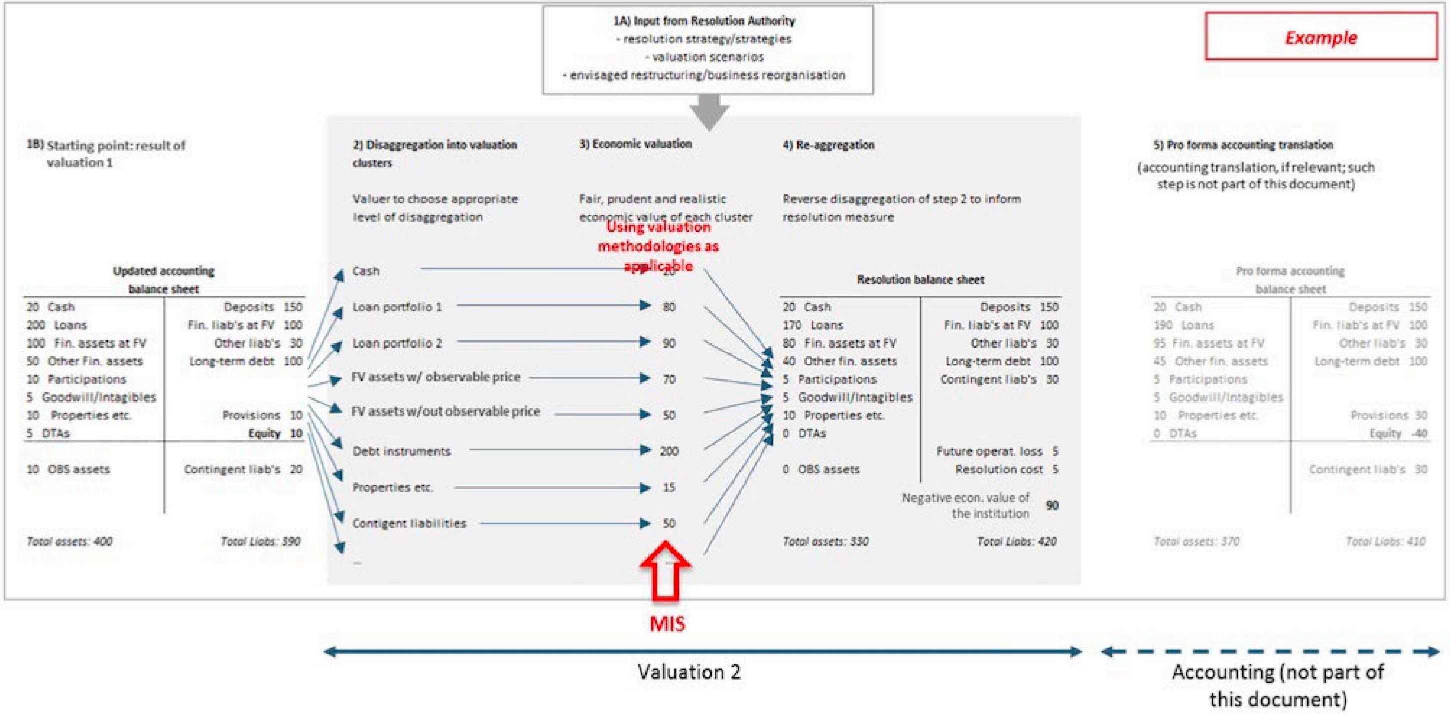
Valuation 1 (failing or likely to fail valuations)
Valuation 2 (asset and liability valuation)
Valuation 3 (equity valuation) (MREL firms only)
Valuation 4 (insolvency counterfactual) (MREL firms only)

Principle 1: Data and information
Principle 2: Models
Principle 3: Valuation methodologies
Principle 4: Valuation assumptions
Principle 5: Governance
Principle 6: Documentation
Principle 7: Assurance

Source: https://www.bankofengland.co.uk/-/media/boe/files/paper/2021/bank-of-englands-sop-valuation-capabilities-to-support-resolvability-may-2021.pdf

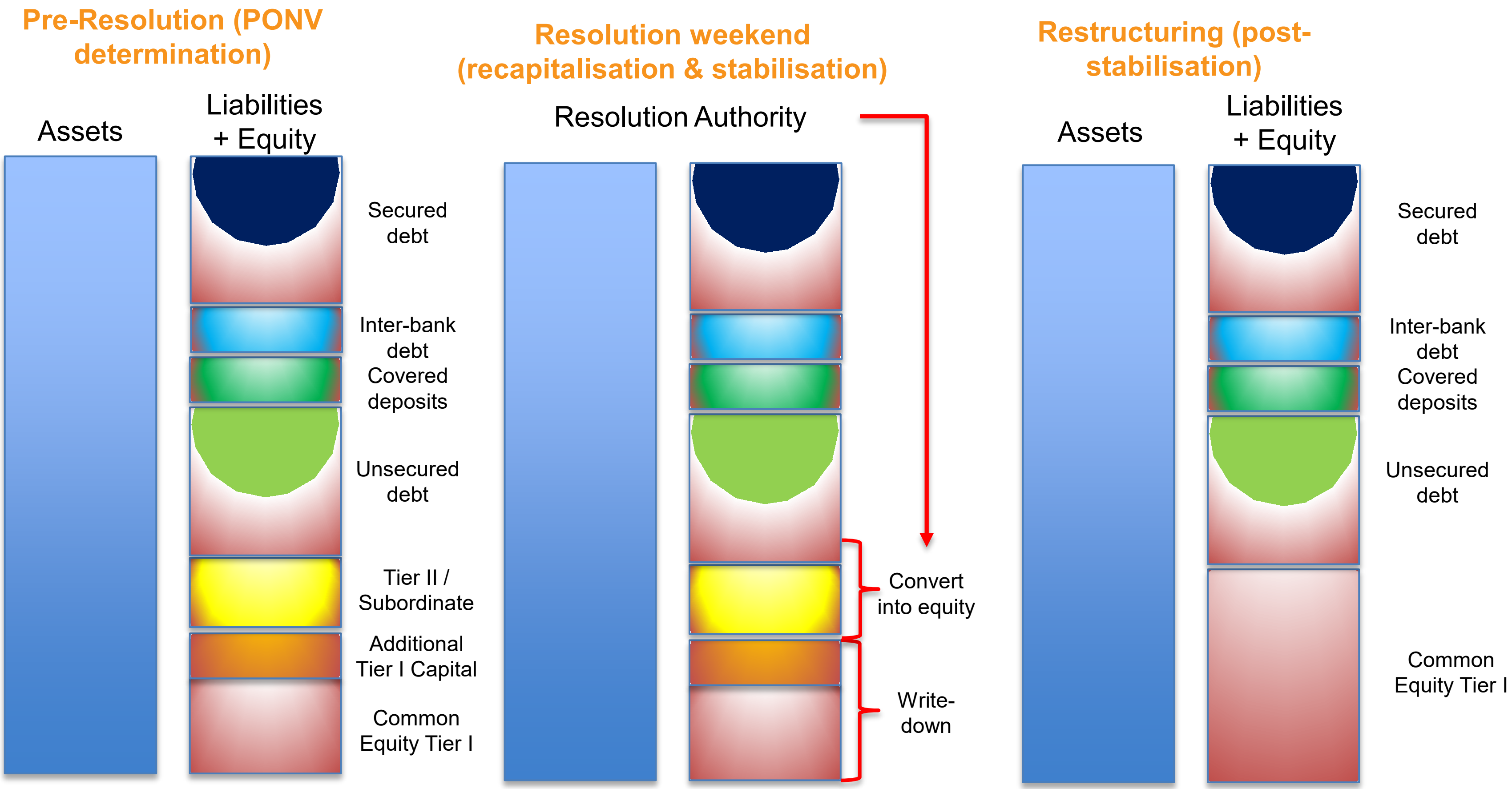
Valuation 2: Inputs & Process

Figure 2. Outline of the conceptual steps that a single asset and liability valuation might follow[18]



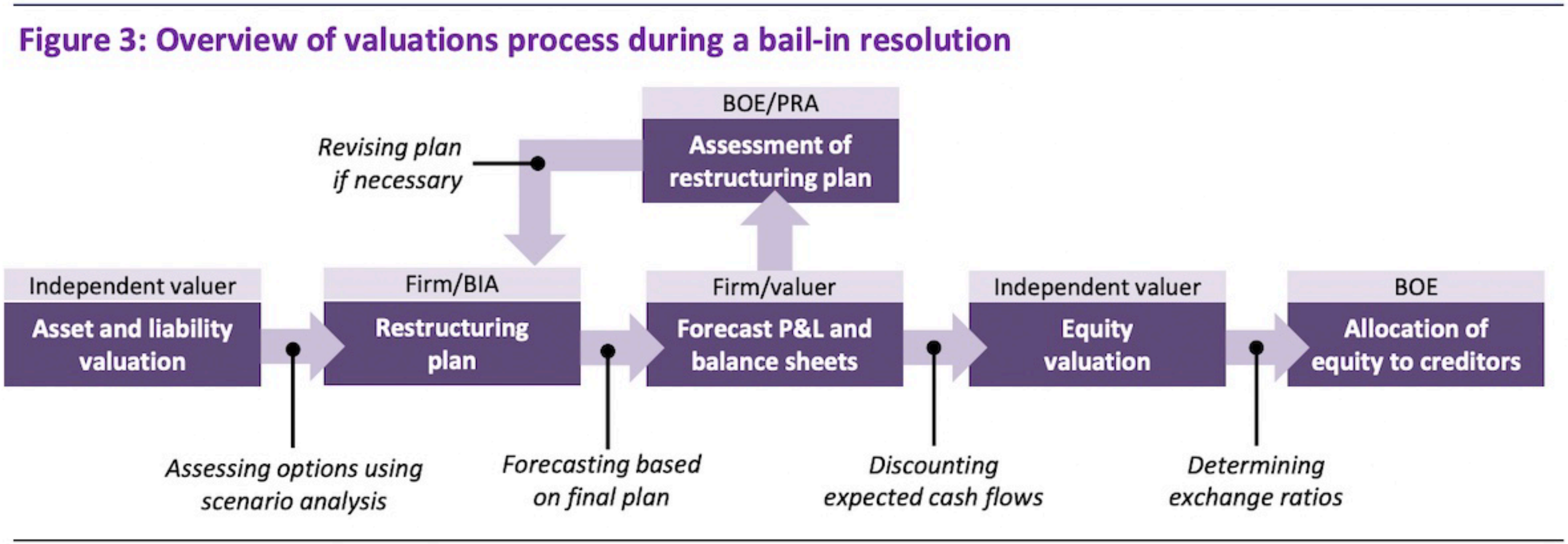
Source: https://www.eba.europa.eu/publications-and-media/press-releases/eba-publishes-handbook-valuation-purposes-resolution

(Input) Resolution strategy: Bail-in



See: https://www.srb.europa.eu/system/files/media/document/22-06-15%20SRB%20Operational%20guidance%20on%20bail-in%20playbooks%20final_0.pdf for additional details in relation to the operationalisation of bail-in strategies

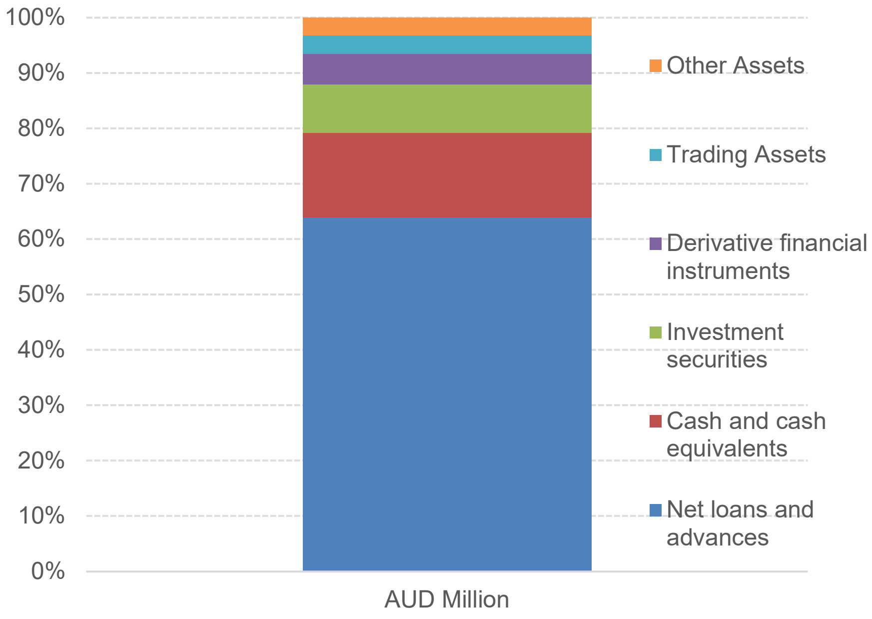
(Input) Valuation Scenarios & Restructuring



Source: https://www.bankofengland.co.uk/-/media/boe/files/paper/2021/bank-of-englands-sop-valuation-capabilities-to-support-resolvability-may-2021.pdf

(1) Sample bank (ANZ) balance sheet

Assets: 1,105,620 (Million $AUD)

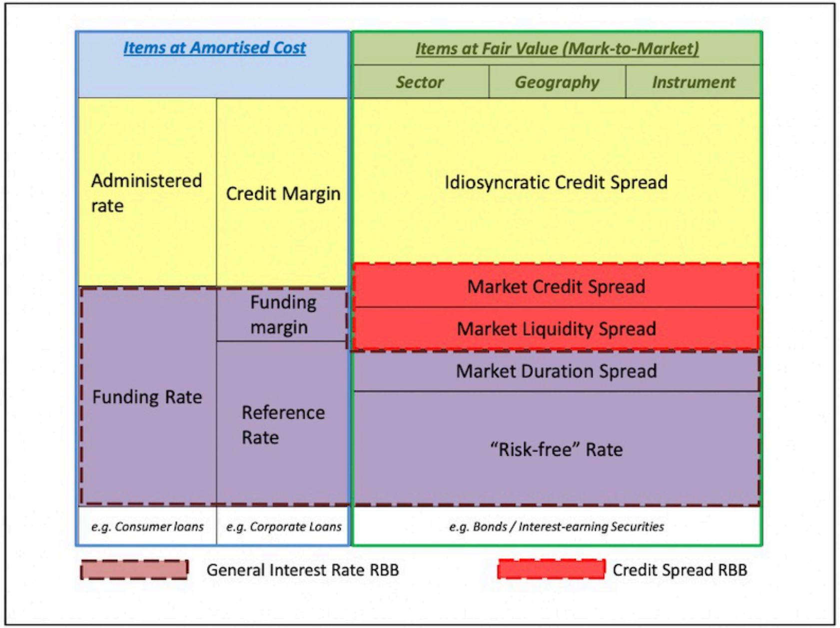


Liabilities: 1,035,574 (Million $AUD)

Source: https://www.anz.com/content/dam/anzcom/shareholder/ANZ-Annual-Report-2023.pdf

(2) Asset pricing: Disaggregation valuation cluster

Figure 1 – Components of interest rates



Source: https://www.bis.org/bcbs/publ/d368.pdf

Retail (Consumer)

- **Residential mortgage**
- Credit card
- Personal loan
- Overdraft
- Margin lending

Non-Retail

- Sovereign
- Bank
- Non-Bank Financial Institutions (NBFIs)
- Specialised Lending (Project finance (infrastucture), Object Finance (shipping), Commodity finance, Income Producing Real Estate (IPRE))
- Corporate
- Small to Medium Enterprise (SME)

(3) Economic valuation: Discounted Cash Flow (DCF)

Figure 4. Simplified description of Bottom Up and Top Down approaches

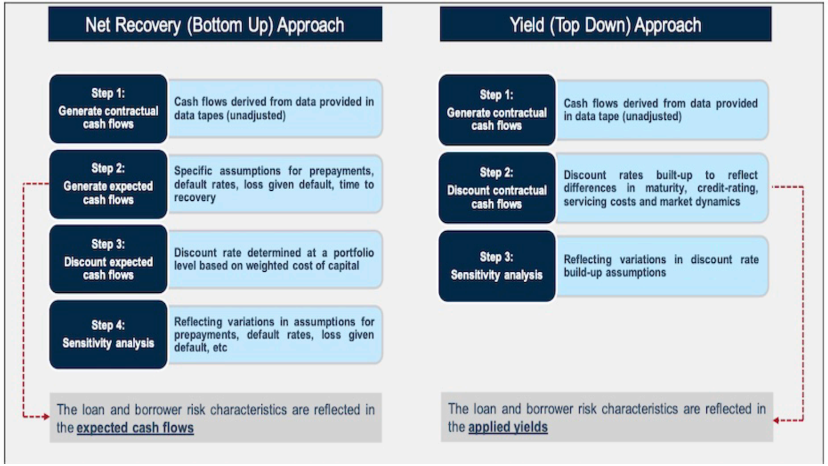
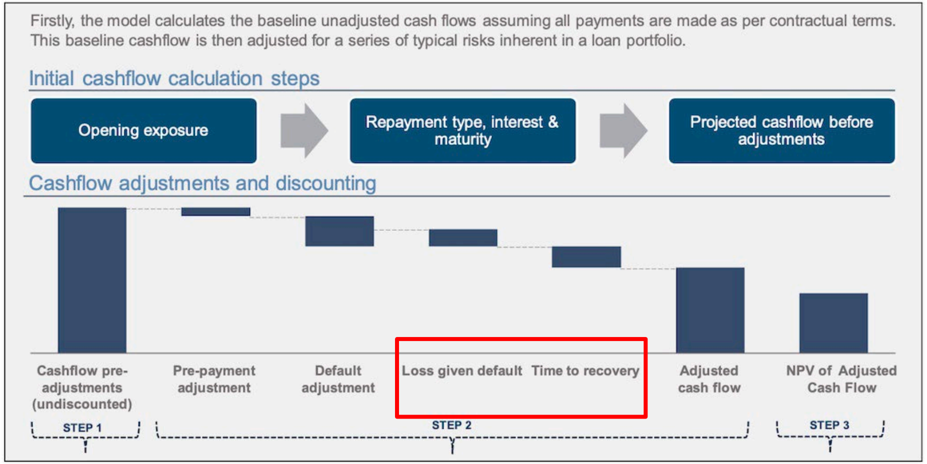


Figure 6. Sample Bottom-Up cash flow adjustments



Source: https://www.eba.europa.eu/publications-and-media/press-releases/eba-publishes-handbook-valuation-purposes-resolution

(3) Economic valuation: LGD Residential Mortgage

'Mixture Model' (Non-Possession (cure) & Possession (non-cure))

$$LGD_{i(j)t} = 1_{\{\tau^P_{i(j)} > (T-t)\}} \delta^0_{i(j)} + 1_{\{\tau^P_{i(j)} \leq (T-t)\}} \delta^1_{i(j)}$$

Via some simplifying assumptions one may define the Possession state random loss parameter

$$\delta^1_{i(j)} = \frac{\left[X_{i(j)t} - exp\left(-(r_f+\gamma)\tau_{i(j)s}\right) \times min\{X_{i(j)t}, A_{i(j)\tau_s}\}\right]}{X_{i(j)t}} = \left(1 - \exp\left(-(r_f + \gamma)\tau_{i(j)s}\right)\right) + \left(\frac{\exp\left(-(r_f+\gamma)\tau_{i(j)s}\right)}{X_{i(j)t}}\right) \times \left[X_{i(j)t} - A_{i(j)\tau_s}\right]^+$$

$\equiv$ Holding Cost + Equity Loss

Where the value of the collateral (house & land) follows a geometric Brownian process (constant by sector(j)) growth $\{\mu_{i(j)}\}$& volatility $\{\sigma_{i(j)}\}$)

$$\frac{dA_{i(j)t}}{A_{i(j)t}} = \mu_{i(j)} dt + \sigma_{i(j)} dZ^p_{i(j)t}$$

$$dZ^p_{i(j)t} \sim \varphi(0, dt)$$

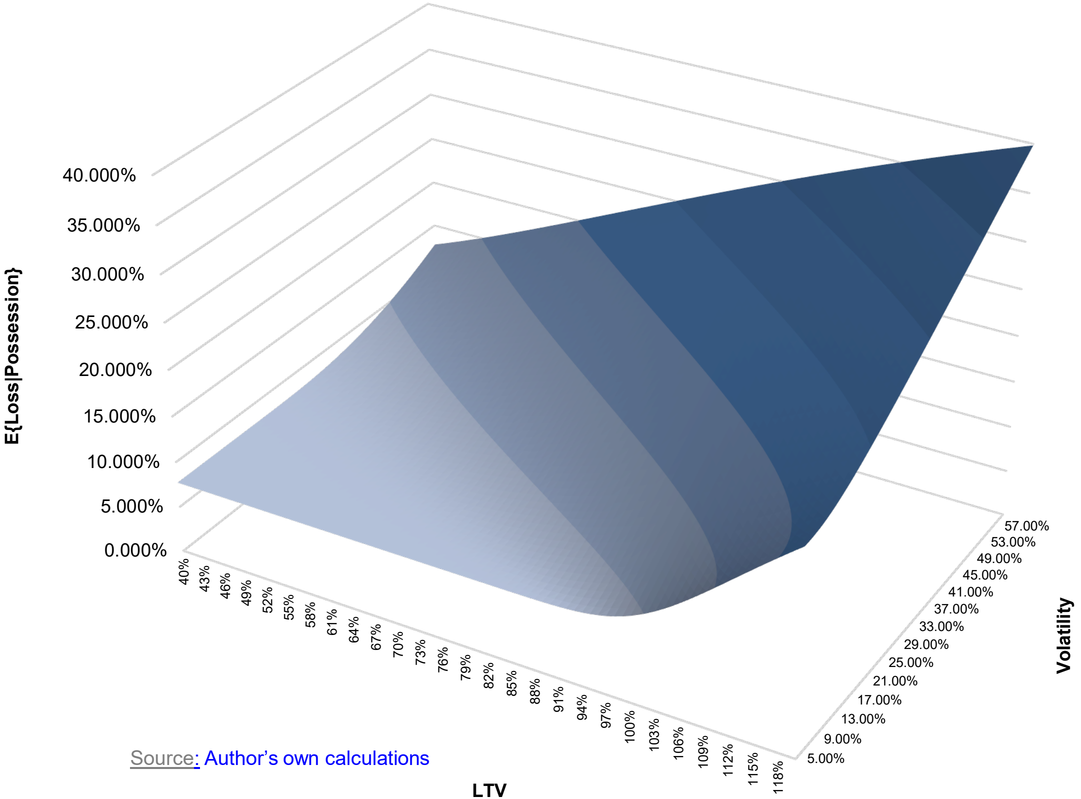
Data requirements (statistical calibration)

- Exposure at default
- Date of possession (given default)
- Date of sale (given default)
- Asset valuation (origination of facility)
- Sale price of property (asset)
- Type of property (house, town-house, apartment, shop-front)
- Geographical location (of asset)
- Type of mortgage (first charge, non-first charge)
- Intra/Inter-sector correlations (House price indices)
- Expenses (internal special asset management, legal, valuations, real estate)

Source: Author's own calculations

(3) Economic valuation: expected loss (given possession)

$$E\langle \delta^1_{i(j)t} \big| f_t \rangle = 1 - exp[-(r_f + \gamma)\tau_{i(j)s}] + \left[exp[-(r_f + \gamma)\tau_{i(j)s}]\Phi(\zeta_-) - \left(\frac{1}{LTV_{i(j)t}}\right) exp[-[\mu_{i(j)} - (r_f + \gamma)]\tau_{i(j)s}]\Phi(\zeta_+) \right]$$



Source: Author's own calculations

Threshold parameters (+/-) are defined

$$\zeta_\pm = \frac{\left[ln(LTV_{i(j)t}) - \left[\mu_{i(j)} \pm \frac{\sigma^2_{i(j)}}{2}\right]\tau_{i(j)s} \right]}{\sigma_{i(j)}\sqrt{\tau_{i(j)s}}}$$

Risk Factors	Value
GDP	-4.00%
Unemployment	10.00%
House Price Index (growth)	-10.00%
Minimum Lending Rate (MLR)	5.00%
Probability of Possession (given default)	76.50%

Black Scholes parameters	Value
Loan-to-Value (LTV) (balance sheet)	70.00%
Asset growth (Property)	0.00%
Risk free rate	3.00%
Volatility (Property)	30.00%
Time to Sale (years)	2.0000
d(+)	1.0528
d(-)	0.6286
ELGD (Possession)	9.81%
ELGD (Non-possession) (non-recoverable costs)	5.00%

Model Risk Parameters (covariance)	
γ_{NP}	0.00%
γ_P	1.50%

Expected Loss Given Default (ELGD)	10.18%

Future Direction of RRP

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Future Direction of RRP – Liquidity & Restructuring
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BoE Resolution Plan Public Disclosures: shortcomings

Adequate Financial Resources

“The Funding in Resolution shortcoming relates to the *production of resolution specific liquidity analysis*, including analysis that identifies and projects collateral balances that may be available to The Banks in resolution.”

“…, relating to The Bank’s Funding in Resolution capabilities. The shortcoming relates to the *production of resolution specific liquidity analysis* and may impact the ability of The Bank’s senior management and the Bank to take timely and robust decisions in a resolution.”

“The Funding in Resolution shortcoming relates to the *production of resolution specific liquidity analysis*, including analysis that identifies and projects collateral balances that may be available to The Bank in resolution. The *Valuations shortcoming* relates to the preparation of *sensitivity analysis under different scenarios* concurrently and the flexibility of resolution specific models to adapt to different inputs and assumptions and may impact the ability of the Independent Valuer to carry out resolution valuations.”

Continuity & Restructuring

“The Bank’s capabilities need to be improved to support delivery of a wide range of potential actions that could be required in different resolution scenarios within a reasonable timeframe, including those that go beyond what would be considered in recovery planning.”

“The shortcoming relates to Bank’s identification and evaluation of all available restructuring options in a wide range of resolution scenarios and may limit the restructuring options that could be executed in a resolution.”

Source: https://www.bankofengland.co.uk/financial-stability/resolution/resolvability-assessment-framework/resolvability-assessment-of-major-uk-banks-2022

Single Resolution Board (SRB), BCBS (2023 Banking Crisis)

Box A: Liquidity outflows of distressed banks – a historical comparison

Table A.1 summarises the outflow rates and associated time period of selected banks during the recent turmoil and the GFC based on public / readily-available data. A.1 compares these outflows with some of the outflow rates in the Liquidity Coverage Ratio (LCR).

Table A.1: Deposit outflow of distressed banks

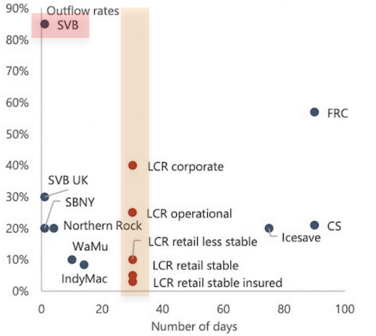
Bank	Deposit outflow	Number of days
SVB (2023)[a]	85%	2
FRC (2023)[a]	57%	90
SVB UK (2023)	30%	1
CS (2023)	21%	90
SBNY (2023)	20%	1
Icesave (2008)	20%	75
Northern Rock (2007)	20%	4
WaMu (2008)	10%	10
IndyMac (2008)	8%	14
LCR[b]	3% - 40%	30

Sources: FRB (2023), NAO (2009), Rose (2015), Zeissler et al (2019), published accounts and Secretariat calculations.

(a) FRC deposit outflows excludes $30bn of deposits placed by banks during Q1 23. SVB outflows include expected outflows by management for 10 March.

(b) LCR outflow rates are the range for retail, SME, operational and corporate deposits.

Graph A.1: Distressed banks and LCR outflows[a]



Sources: FRB (2023), NAO (2009), Rose (2015), Zeissler et al (2019) published accounts and Secretariat calculations.

(a) FRC deposit outflows excludes $30bn of deposits placed by banks during Q1 23. SVB outflows include expected outflows by management for 10 March.

Source: https://www.srb.europa.eu/system/files/media/document/SRB-Work-Programme-2024-final%20web.pdf

Source: https://www.bis.org/bcbs/publ/d555.pdf

Opportunities for Actuaries in Banking

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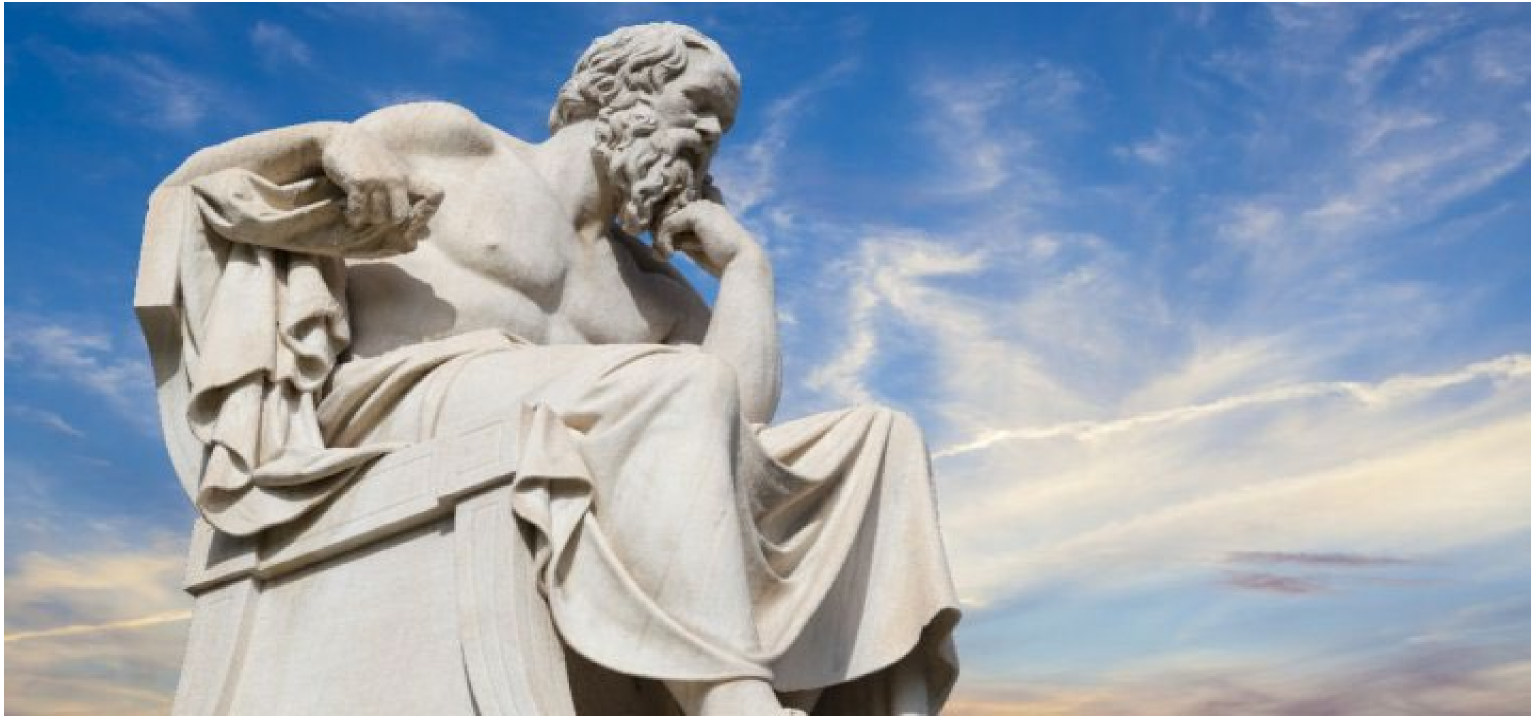
Opportunities for Actuaries in Banking

"How can actuaries support banks' RRP activities?"



Questions & Answers

For Information:

1. Questions & Comments - Should you have any questions or comments they can be sent to the IAA Secretariat at technical.activities@actuaries.org and they will be forwarded on to the presenters directly on your behalf for a response.
2. Presentation and Recording – A YouTube recording of this webinar will be made available on the IAA website at www.actuaries.org under the Events/Webinars tab within the next few days.

Thank you

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