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An Actuarial Practice Guide to ICAAP

25 June 2025

Agenda



- Why talk about the Internal Capital Adequacy Assessment Process?
 - ICAAP regulatory requirements / guidance
 - ICAAP building blocks
 - Business Model & Operating Environment
 - Material Risk Assessment
 - Risk Appetite Statement (RAS)
 - Capital Planning & Forecasting
 - Enterprise-Wide Stress Testing (EWST)
 - Management Actions
 - Summary & Q&A?
-



Why ICAAP?



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The diagram illustrates the components of a Risk Management Framework, showing the flow from Hierarchies (Planning Structures) to Front Book Models, Risk and Macro Factor Scenarios, and Dynamic Optimization.

Hierarchies (Planning Structures)

- B/S (Balance Sheet)
 - Assets
 - GL (General Ledger)
 - USD
 - EUR
 - AFS (Available for Sale)
 - HTM (Held to Maturity)
 - Liab. (Liabilities)
 - GL (General Ledger)
 - Fix (Fixed)
 - Float
 - Non_Mat (Non-Maturing)
 - GL (General Ledger)
 - Corporate
 - Retail

Front Book Models

- Volume
 - New business
 - Total volume
 - Balancer
- Maturity
 - Like-for-like
 - Portfolio mix
- Pricing
 - Current margins
 - Margin scenarios

Risk and Macro Factor Scenarios

- Macro Factors
 - Spreads
 - Volatility
 - Interest
 - FX

Behavioural Models

- Asset (Loan)
 - Prepayment
 - Option exercise
 - Replication
- Impairment
 - PD / PD adjustment
 - LGD / LGD adjustment
 - CCF
- Off-balance sheet
 - Retail / Commercial Deposits
 - Client inflow / outflow
 - Roll-over risk
 - REPOs / Debt
 - Haircuts
- Market (derivatives) / Non-Market (contingent facilities)
 - Potential Future Exp
 - Pipeline / Drawdown

Dynamic Optimization

- Assets
 - Assets
 - Liabilities
 - Assets
 - Liabilities
 - Assets
 - Liabilities
 - Assets
 - Liabilities
- Baseline Scenario
- Adverse Scenario
- Assets
 - Liquidity
 - Investm. book
 - Loans
- Liabilities
 - Deposits
 - Debt Issues
 - Capital
- Timeline: t=0, t=1, t=2, t=3

Buildings

- Build structures from Position information & Risk/Macro factors (drag & drop)
- Different structures for different planning steps

Front Book Models

- Create and assign models
- Choose between standard and custom models (formula editor)
- Deliver (stress-)parameter for these models

Risk and Macro Factor Scenarios

- Static and time dependent scenarios and combination of both
- Full flexibility for Spreads and Macro Factors
- Possibility to embed in all models

Dynamic Optimization

- Balancing
- Funding and investment strategies
- Hedging recommendations
- Regulatory constraints: Capital, liquidity, IRRBB..
- Optimization of NII / RORAC

Why ICAAP? Real-World Practice (Cont.)



Deterministic Optimisation

Lifting the game on ICAAP and unlocking business value by making money do more

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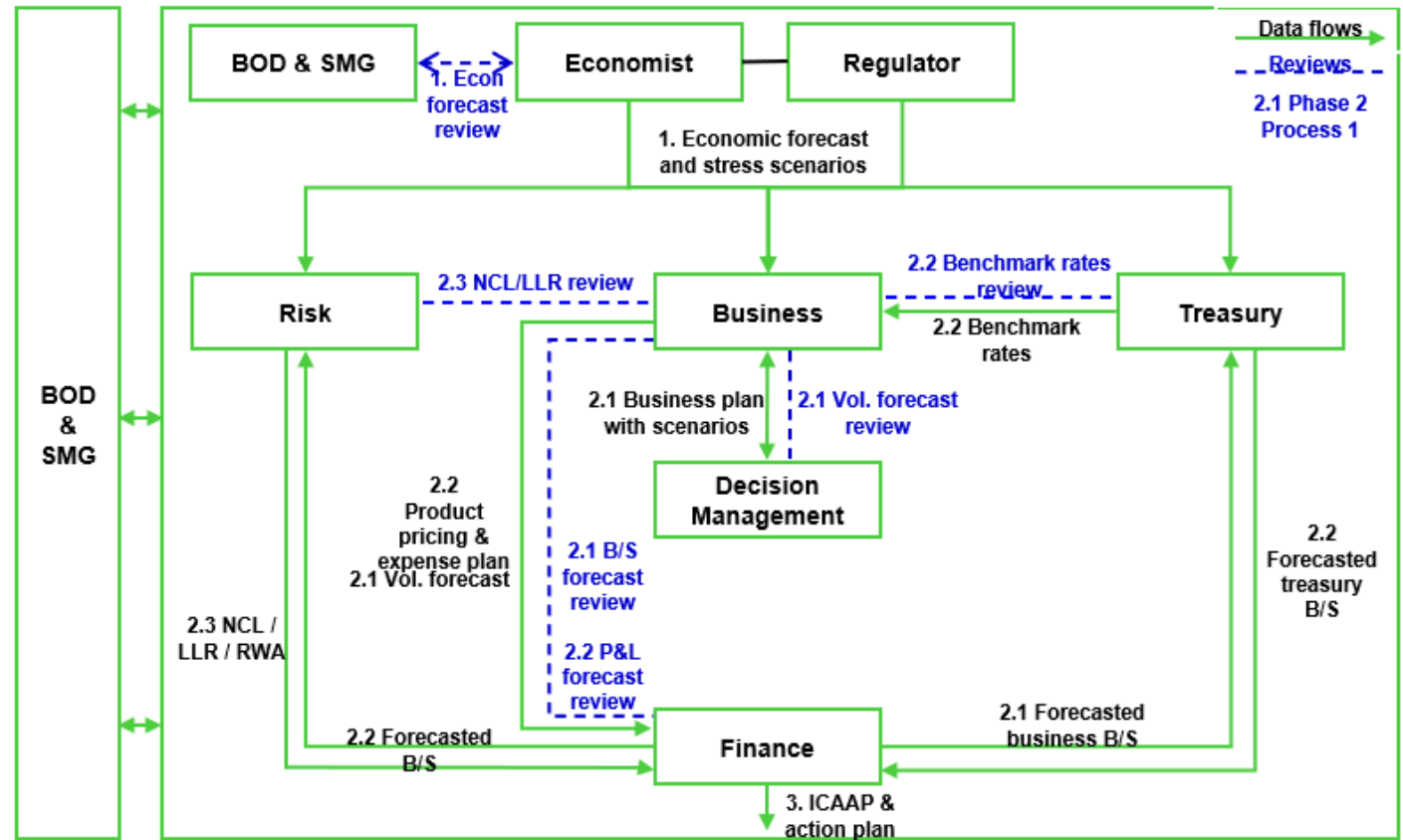


In today's volatile and fast-moving risk environment, accurate and agile assessment of capital and risk requirements under the Basel Committee on Banking Supervision's Internal Capital Adequacy Assessment Process (ICAAP) is fundamental to banks' economic stability and competitiveness.

But banks face significant challenges in holistic balance sheet management while complying with ICAAP due to the volume and complexity of Basel regulations, fragmentation of risk assessment across credit, market and operational risk, and tension between capital

requirements and capital buffers.

The ICAAP should enable the board to make judgements about – and to set – the bank's business model, financial forecasts, risk appetite statement, possible management actions, capital requirements (for base case conditions) and capital buffer (for possible adverse stress scenarios).



Source: <https://www.risk.net/resource/7961266/lifting-the-game-on-icaap-and-unlocking-business-value-by-making-money-do-more>



ICAAP requirements



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ICAAP Requirements

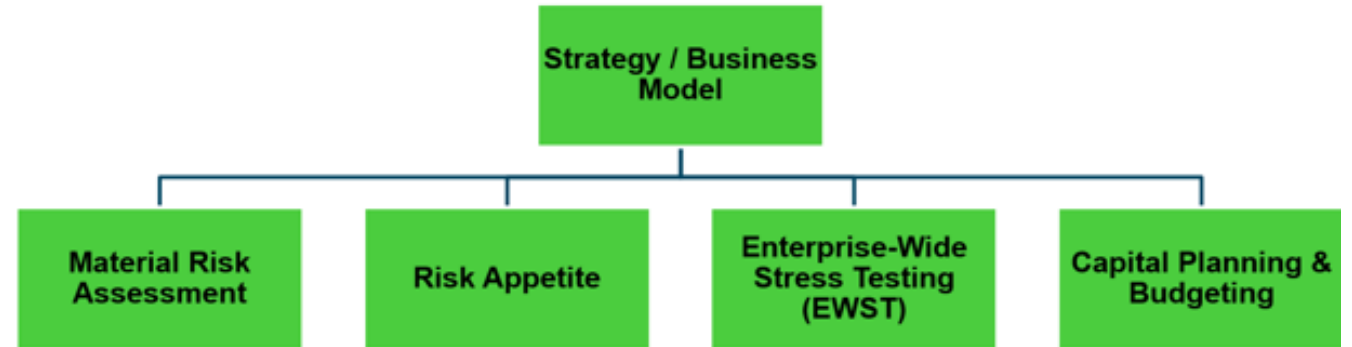


The four key principles

- 20.1** Principle 1: Banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.
- 20.2** Principle 2: Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the result of this process.
- 20.3** Principle 3: Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum.
- 20.4** Principle 4: Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank and should require rapid remedial action if capital is not maintained or restored.

Source: <https://www.bis.org/baselframework/BaselFramework.pdf>

ICAAP: BUILDING BLOCKS



ICAAP Requirements (Cont.)



Practice guides



PRUDENTIAL PRACTICE GUIDE

CPG 110 Internal Capital Adequacy
Assessment Process and Supervisory Review

November 2023

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Source: <https://www.apra.gov.au>



Qatar Central Bank

Guidance on the Application of the Internal Capital Adequacy Assessment Process (ICAAP)

28th February 2016

Source: https://www.qcb.gov.qa/Documents/BankInstructions2024/AR/1041-1090_annex015.pdf

ICAAP Requirements (Cont.)



Generalised: Varies by Geography, Size & Complexity

Table of Content

1. **Executive summary**
 - a. Capital adequacy assessment results
 - b. Pillar II risk assessment results derived from ICAAP
 - c. Stress test results and capital impact
 - d. Capital plan
 - e. Changes since in the ICAAP since last reporting period
2. **Bank profile**
 - a. Business profile & significant activities
 - b. Key financial metrics
 - c. Overview of risk management & processes
3. **Overview of ICAAP & Governance**
 - a. Overview of ICAAP: Flow charge
 - b. Risk Appetite Statement
 - c. Governance structure
 - d. System for monitoring & control risks
 - e. Delegation & monitoring
4. **Assessment of significant risk & capital demand**
 - a. Approach, process, and factors in determination
 - b. Pillar I risks – minimum capital requirements
 - c. Pillar II risks – prudential capital requirements
5. **Stress testing**
 - a. Scope of risks
 - b. Methods for stress testing
 - c. Details of portfolios / selected positions
 - d. Tested methods & assumptions
 - e. Details test results
 - f. Risk mitigation plan & linked with capital adequacy
6. **Capital planning**
 - a. Static balance sheet: Pre/post risk mitigation (base, crisis scenario)
 - b. Front book: Pre/post risk mitigation (base, crisis scenario)
 - c. Capital plan: Pre/post risk mitigation (base, crisis scenario)
7. **System for ICAAP reporting**
 - a. Overview of reporting systems: risk positions & capital adequacy
 - b. Date of report management reporting & action plans
8. **Validation of ICAAP**
 - a. Internal audit report

Internal capital adequacy assessment process template

Information	Table of contents	Accompanying documents
	• Executive summary • Background of ICAAP • Statement of risk appetite • Material risks • Capital planning • Stress and scenario testing • Integration of ICAAP into risk management • Challenge and next steps	

Source: <https://www.osfi-bsif.gc.ca/en/guidance/guidance-library/internal-capital-adequacy-assessment-process-template>



ICAAP building blocks



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ICAAP Building Blocks: Business Model / Environment



The fundamental question that the ICAAP seeks to address is

“Will the Board be able to distribute its forecasted dividend payout to ordinary shareholders, whilst meeting its regulatory constraints (across capital, liquidity, funding and leverage), in light of its business model within the current operating environment?”

Earnings are driven by the range of services the bank provides and the operating environment. Services for a modern bank range across:

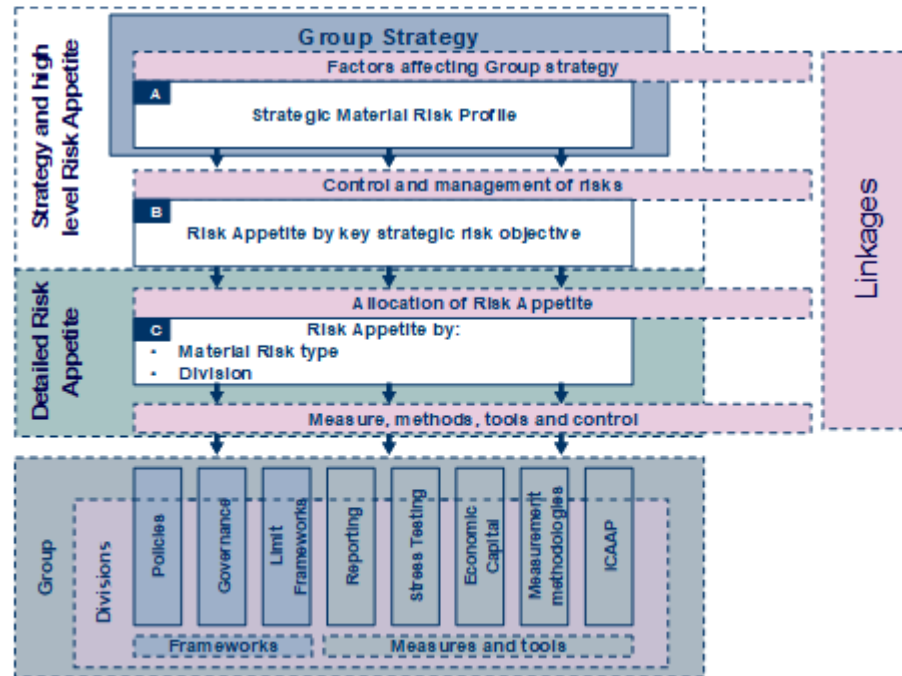
- Acceptance of deposits, at-call and term, from counterparties with surplus funds and/or entities requiring transactional accounts
 - Extension of credit facilities to the Sovereign, Financial, Corporate and Retail sectors
 - Provision of payments, clearing, and settlement services to financial market participants
 - Raising and extension of funds to the Wholesale Market (covering Securities Finance Transactions (SFTs) and risk transferal products, such as SWAPs); *and*
 - Participation in capital markets and provision of investment services, ranging across primary (issuance, underwriting) and secondary markets (market making, proprietary trading) to advisory services

 - **Universal bank:** characterized by a relatively high Net Interest Income as a percentage of the Operating Income; high ‘Loans and Receivables’ relative to Total Assets, and a medium level of Income from Fees and Commissions relative to Operating Income
 - **Investment bank:** characterized by a high ratio of Trading Income relative to Operating Income
 - **Wealth Management / Private Bank:** characterized by a high ratio of Fees and Commissions relative to Operating Income, low lending to deposit ratio, and low lending to total assets ratio
-

ICAAP Building Blocks: Material Risk Assessment / RAS



- Risk Appetite is a critical element of a Banks Risk Management Framework and therefore forms the key foundation of risk assessment required for the ICAAP.
- The Board approved Risk Appetite statements are an articulation of the 'amount' of risk the Bank is prepared to take in conducting its activities.
- The management and control frameworks for the Bank's material risks are linked to these Appetite statements.
- The strategy and capital plan is devised with this framework in mind and regularly checked to ensure they are consistent. Any areas of divergence should be reported on and actively managed by senior committees in the Banking Group.
- It is important the ICAAP demonstrates these relationships showing risk management and strategy are aligned.



	Strategic Risk Profile	Maintain Capital Adequacy	Deliver Stable Earnings Growth	Stable/ Efficient Access to Funding	Maintain Market Confidence
	Key Risk Appetite Measures	- RWA Mgmt - Capital Allocation - Stressed ratios - Leverage Ratios	- Earnings Volatility - Value at Risk - Credit Volatility	- Cost of Funding - Leverage Ratios - Stressed measures	- Target Agency Rating of AA - Reputation Risk
1	Credit Risk	✓	✓		✓
2	Market Risk	✓	✓		✓
3	Operational Risk	✓	✓		✓
4	Regulatory Risk	✓	✓	✓	✓
5	Country Risk	✓	✓		✓
6	Insurance Risk	✓	✓		✓
7	Pension Risk	✓			
8	Liquidity Risk		✓	✓	✓
9	Interest Rate Risk in the Banking Book	✓	✓	✓	✓
10	Strategic Risk	✓	✓	✓	✓
11	Reputation Risk	✓	✓	✓	✓
12	Business Risk		✓		✓

ICAAP Building Blocks: RAS (Credit Risk example)



Indicator	Description	Sub-weight	Alert / Limit	
C1: NPL ratio	Non-performing loans (NPL) as % of loan portfolio	25%	< 1.05% [6]	Alert
C2: NPL coverage ratio	Provisions as % of NPL	2.5%	> 85% [6]	Alert
C3: Unsecured NPL coverage ratio	Provision / [NPL – Collateral Value]	2.5%	> 150% [7]	Alert
C4: NIL%	Net impairment loss ratio (12 months)	20%	< 0.35% [6]	Alert
C5: Total Loan Portfolio EL	Total loan portfolio expected loss (IFRS 9)	15%	< 0.35% [6]	Alert
C6: Bond Portfolio EL	Bond portfolio expected loss	10%	< 0.45% [4]	N/A
C7: Country Risk	% in sub-investment grade countries over total exposure	5	< 10 % [6]	Limit
C8 Concentration Risk	Borrowers (Top 20) exposure as a % of Common Equity Tier 1	10%	< 190% [8]	Alert
C9: Concentration Risk (Property)	Property exposures as % of Total Capital base	10%	< 250% [6]	Alert

The bank supports stable growth with a key focus on controlling concentration risk, and on core credit risk components closely managed within the Bank's operating plan and budget including the Non-Performing Loan (NPL) ratio and Net Impairment Loss (NIL) ratio. Credit risk parameters are closely monitored against internal limits and regulatory requirements stipulated in the Credit Risk policies. Regular portfolio reviews are conducted with ongoing monitoring of high-risk industries and countries. Prudent provisioning principles are adopted and stipulated in the Bank's policies and processes.

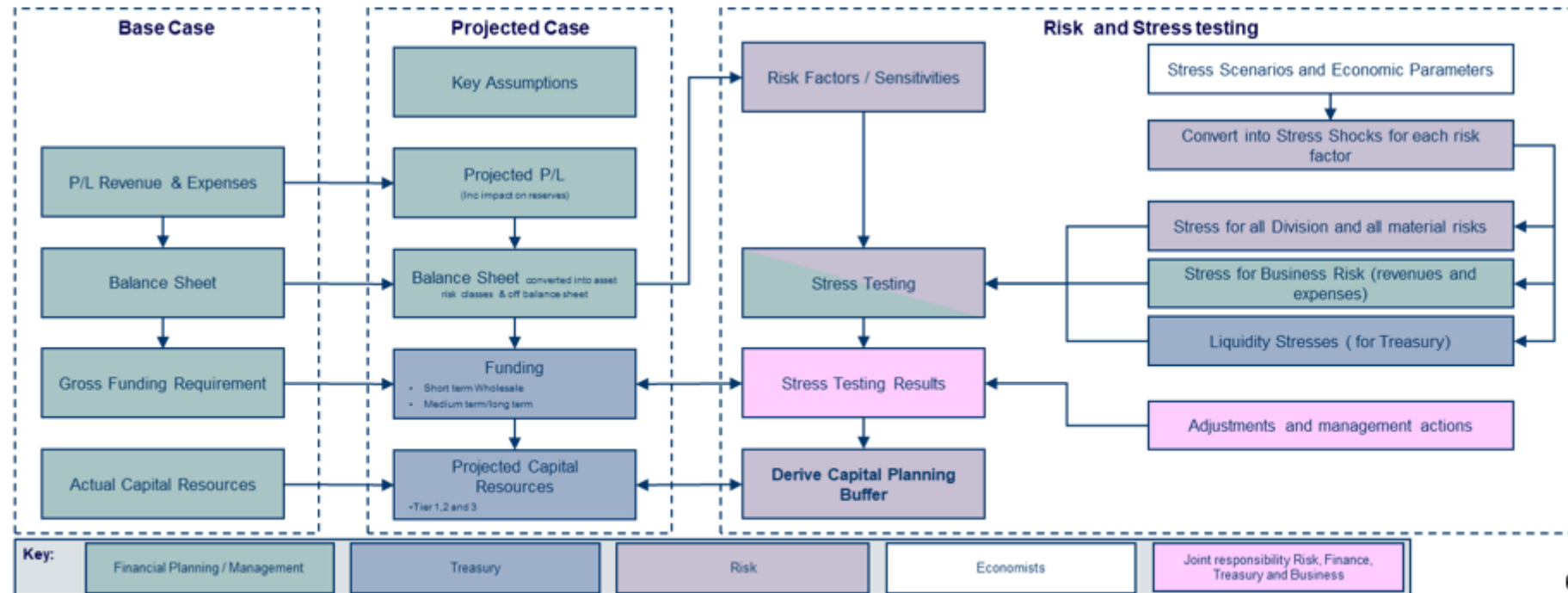
Operational Risk (loss % gross income), Market risk (Trading book VaR/Stress VaR), IRRBB (EVE, NII), etc...

ICAAP Building Blocks: Capital Planning / Forecasting



Annual Planning Cycle

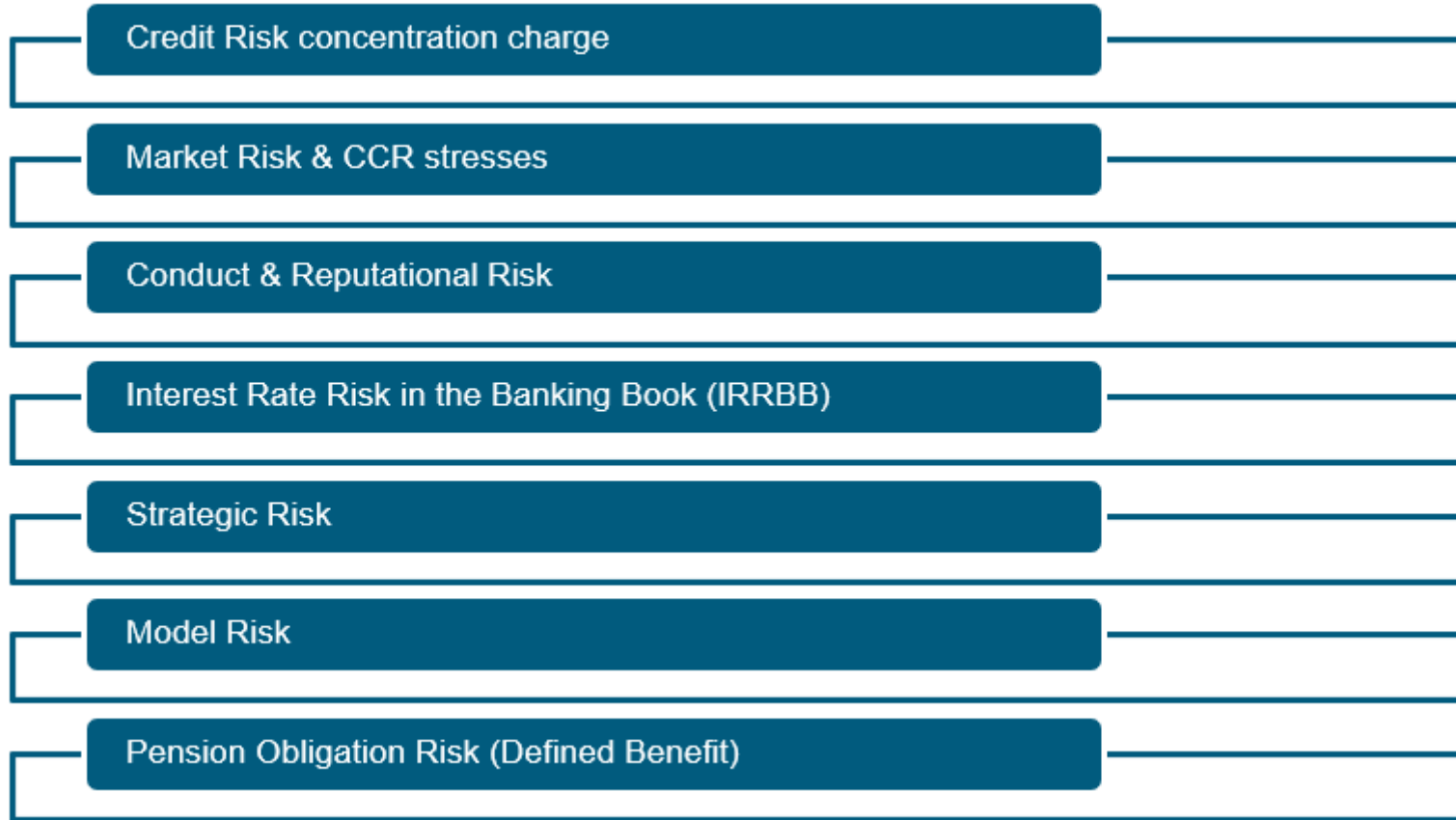
- The Capital planning element of the Group ICAAP is delivered from the output of the annual financial planning process.
- This is primarily managed by Group Finance, with input from Group Treasury and Risk Management. It is built bottom up from each business Division.
- Once complete the plan is then stressed through different economic scenarios to understand its sensitivities and vulnerabilities.
- Where appropriate the financial plan is amended or contingency plans put in place for management action, in the event of a particular stress event materialising



ICAAP Building Blocks: Capital Planning / Forecasting (Cont.)



Pillar I modifications / additional Pillar II risks

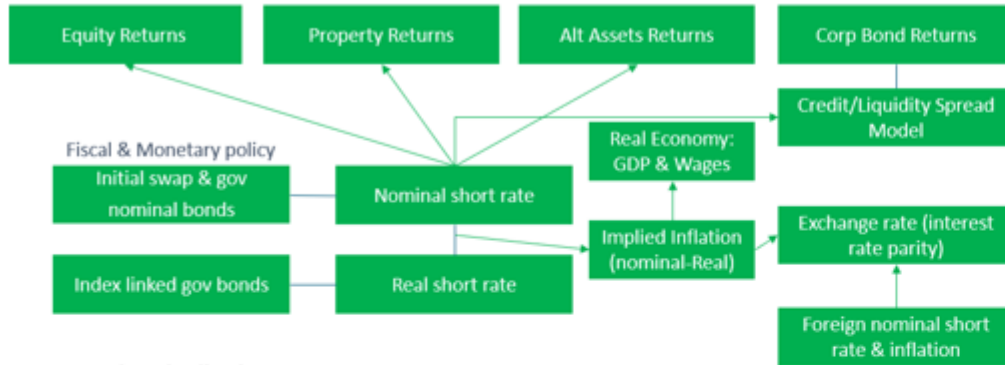


ICAAP Building Blocks: Enterprise-Wide Stress Testing



Coherent Economic Scenario Generation

Figure: Domestic Open Economy



Joint Distribution:

- Correlation relationships between shock & model components
- Economically rational structure

(a) Credit losses

Bank-specific credit loss rate (UK)

$$CL_{i,t}^{b,j} = \alpha_{i,t}^{b,j} + (ACI_{i,t}^j - \overline{ACI_{i,t}^j})$$

$$\alpha_{i,t}^{b,j} = (1 - \rho^b) \mu^{b,j} + \rho^b \alpha_{i,t-1}^{b,j}$$

where

i : asset class index (household secured, household unsecured, corporate, others)

$CL_{i,t}^{b,j}$: asset class i 's credit loss rate of bank b

$ACI_{i,t}^j$: the aggregate credit loss rate of asset class i (derived below)

$\overline{ACI_{i,t}^j}$: the long-run average of $ACI_{i,t}^j$

$\alpha_{i,t-1}^{b,j}$: the actual write-off rate of bank b 's asset class i

$\mu^{b,j}$: the historical average of $CL_{i,t}^{b,j}$

ρ^b : the bank b 's speed of convergence to the historical average $\mu^{b,j}$

(b) Net interest income (NII)

$$NII_t^b = \sum_i r_{i,t}^{b,i} A_{i,t}^{b,i} - \sum_j r_{j,t}^{b,j} L_{j,t}^{b,j}$$

where

NII_t^b : bank b 's net interest income

$r_{i,t}^{b,i}$: bank b 's lending rate for asset class i

$r_{j,t}^{b,j}$: bank b 's borrowing rate for liability class j

$A_{i,t}^{b,i}$: bank b 's amount of asset class i (loans and advances to customers)

$L_{j,t}^{b,j}$: bank b 's amount of liability class j

$$r_{i,t}^{b,i} = f\left(\left\{r_{i,t}^{i,1}, \dots, r_{i,t}^{i,n}\right\}, \left\{CL_{i,t}^{b,i}\right\}\right)$$

where

$r_{i,t}^{i,1}$: risk-free rate at time t

n : the maturity of asset i

$$r_{j,t}^{b,j} = \text{Libor}_t + \text{sp}(\text{rating}_t^j)$$

where

sp : ratings spread function, mapping bank b 's credit rating to a funding spread

rating : ratings function, mapping variables such as the bank's profit and funding gap to ratings

(d) Trading income (TI)

$$\frac{TI_t^b}{TA_{t-1}^b} = 0.007 + 0.5034 \frac{TI_{t-1}^b}{TA_{t-2}^b} + 0.0202 \frac{\Delta TA_t^b}{TA_{t-1}^b} + 0.2105 (\Delta \ln EP_t)^2$$

where

TI_t^b : bank b 's trading income

TA_t^b : bank b 's net trading asset

EP_t : world equity index

(e) Operating expenses (OPEX)

$$\frac{OPEX_t^b}{NII_{t-1}^b} = \gamma^b + 0.598 \frac{OPEX_{t-1}^b}{NII_{t-2}^b} - 2.365 \Delta \ln GDP_t$$

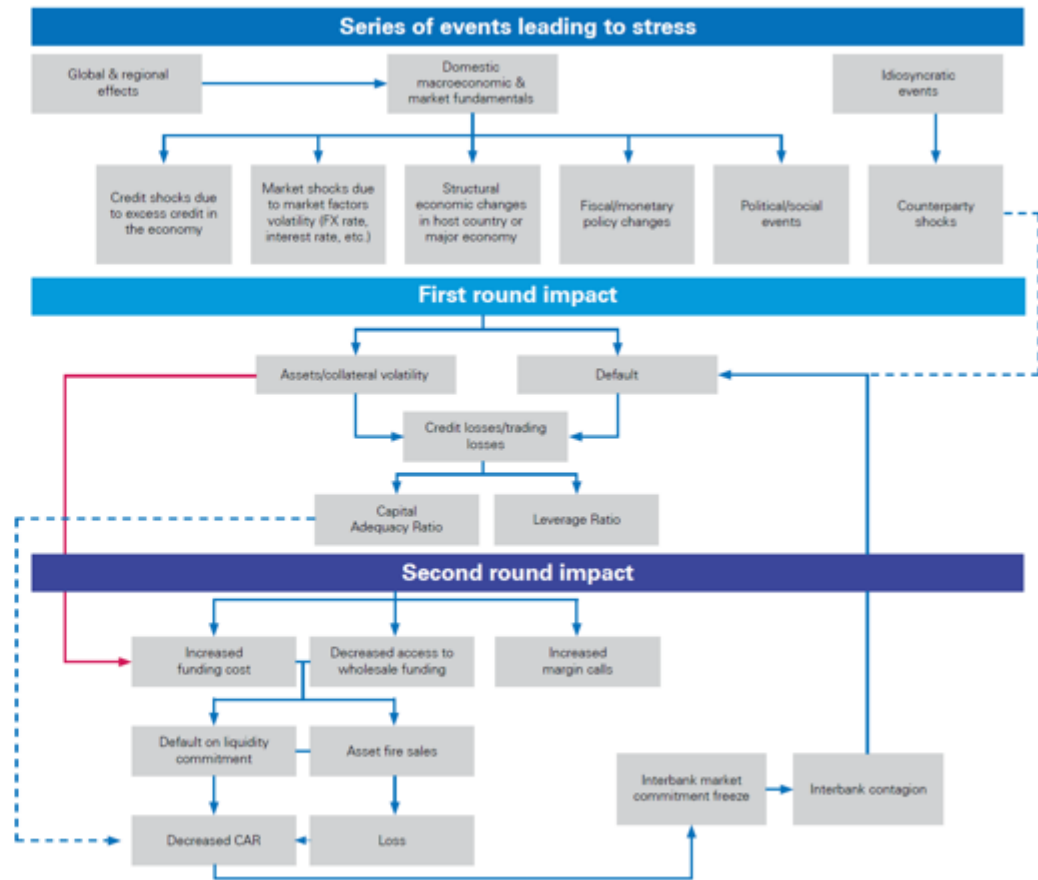
$$\gamma^b = \frac{(1 - 0.598) OPEX_t^b}{NII_t^b} + 2.365 \Delta \ln GDP_t$$

where

$OPEX_t^b$: bank b 's operating expenses

$OPEX_t^b$: the long-run average of operating expenses

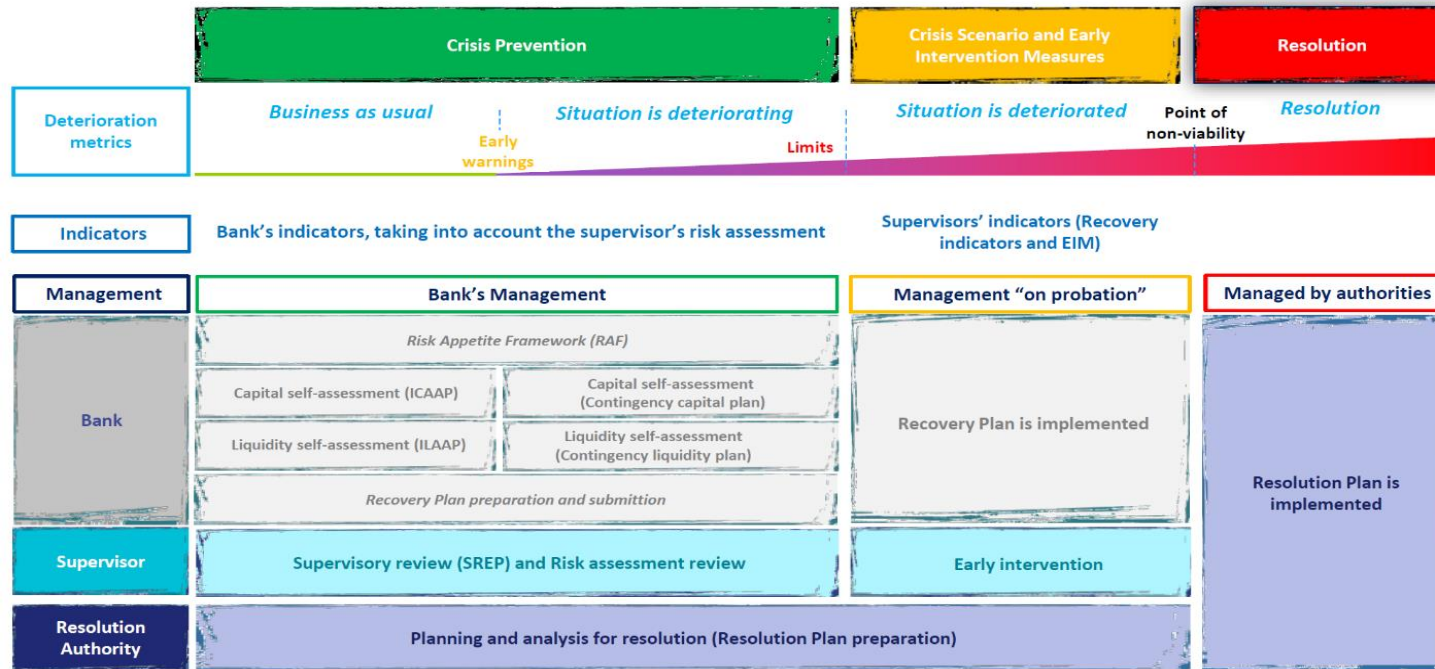
Figure 2: An illustration of solvency-liquidity interlink and interbank contagion effect



Source: <https://www.bankofengland.co.uk/financial-stability-paper/2012/ramsi-a-top-down-stress-testing-model>

Source: (Claxton, Davis, Thiruvengadam) <https://assets.kpmg/content/dam/kpmg/pdf/2016/03/SG-KPMG-Driving-Business-Value-Through-Stress-Testing.pdf>

ICAAP Building Blocks: Management Actions



- Capital raising
- Liquidity management
- Balance sheet reductions
- Expense reduction
- Business disposal
- Capital and liquidity repatriation

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



Summary



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Summary: Why ICAAP for Actuaries?



- Pre-cursor to balance sheet optimisation
 - Actuaries able to communicate across finance, risk and treasury
 - Diverse range of practice observed
 - Supervisory Review Process (SRP)
 - Business model, operating environment, size & complexity
 - Material Risk Assessment
 - Pillar I – Credit / Market / Operational (IRRBB – Australia)
 - Pillar II – Pillar I Adjustments + Additional Risk
 - Risk Appetite Statement
 - {Solvency, Earnings, Funding, Reputation}
 - Capital planning & forecast (Capital Supply)
 - Forward capital position and main assumptions related to the business plan (3-5 years)
 - Enterprise-Wide Stress Testing (EWST) (Capital Demand)
 - Management Plans
-



Thank you.... Questions?



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