

Stress Testing Best Practices and How Enhancement of Traditional Techniques Can Be Achieved

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Wolters Kluwer

Agenda

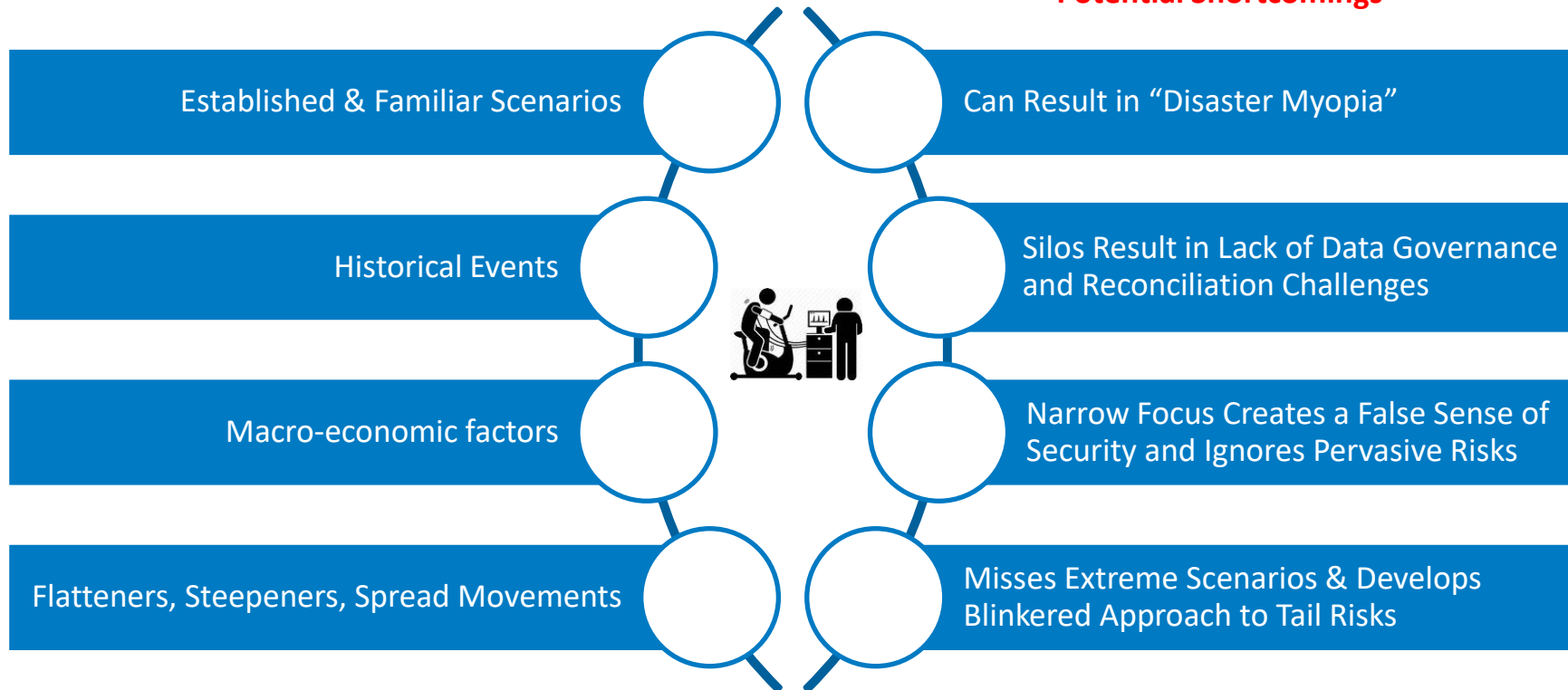
- **Thematic Stress Testing with ESG data and Reverse Stress Testing**
- Modelling methodology and capabilities needed end-to-end
- Use cases of implementing effective business-relevant Stress Tests



Stress Testing

Traditional Stress Testing

Potential Shortcomings



Basel Committee: April 2021



Climate Risk Related Recommendations

Current Practices

Credit Quality Transition Risk Scenario Analysis Using Sector Specific Data

No Consideration of Physical Risks with Geo-spatial Data Assessment

Scenario Analyses with Sectoral and Counterparty Data for relevant portfolios

Mitigation of Event Risks with Augmented Insurance contracts

Recommended Actions

Must Be Integrated into Bank's Overall Risk Management Processes and Risk Appetite

Exposure Measurements Based on Geo Specific Wildfires, Sea Level Rise, etc.

Continuous Monitoring of "Transmission" into Entire Portfolio

Build Events as KRIs and Triggers Into bank Wide Operational Risk Framework



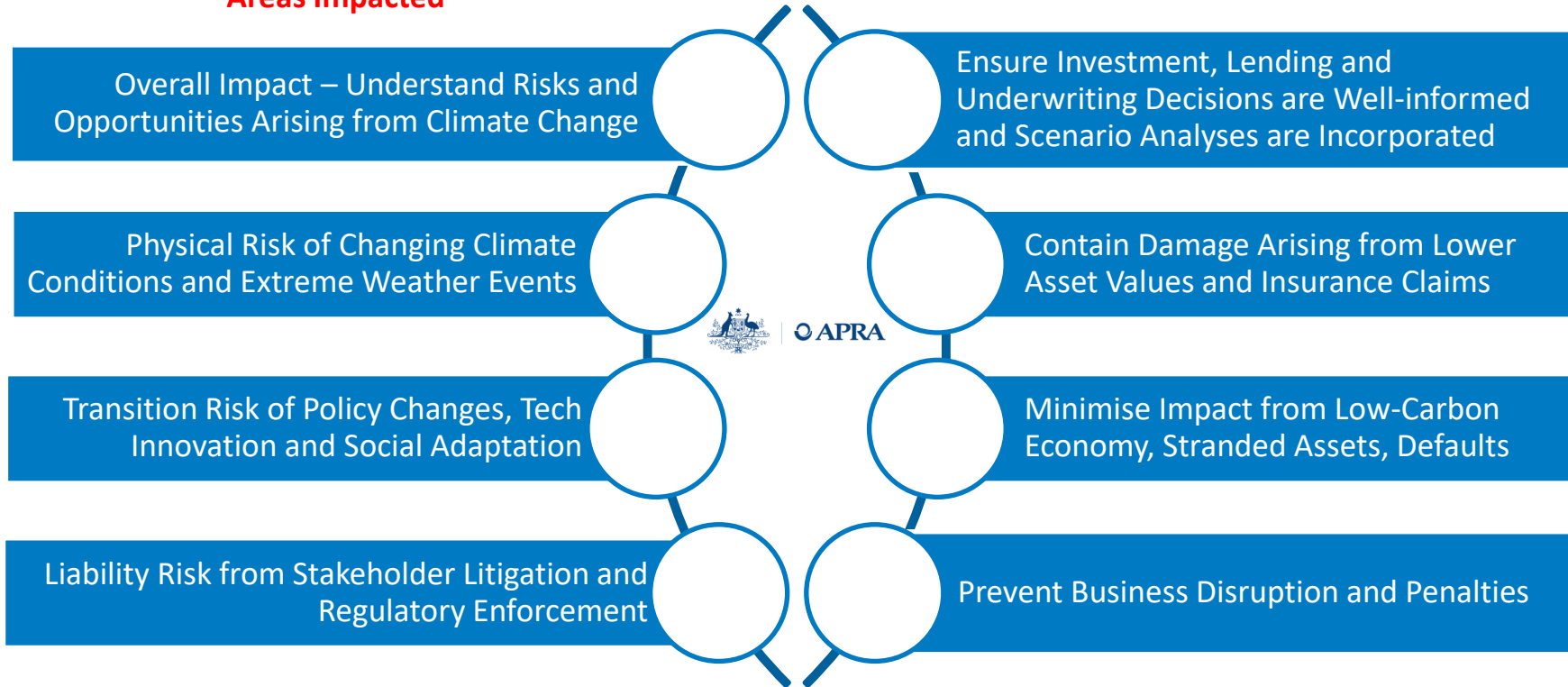
Australian Prudential Regulatory Authority: April 2021



CPG 229 - Climate Change Related Financial Risk

Areas Impacted

Recommended Actions



Monetary Authority of Singapore MD: December 2020

Fintech as A “Force For Good” Agenda

Fintech for A Sustainable Planet

Capital for Cleaner Energy and Making All Precincts More Energy Efficient

Circular Economy Where Resources Are Re-cycled to A “Deeper Green”

Exploring AI and Other Cognitive Technologies to Measure Real Impact

Strengthening Financial Sector’s Resilience to Environmental Risks



Monetary Authority of Singapore

Fintech for An Inclusive Society

Pervasive Digital Inclusion with Digital Wallet and e-Pay infrastructure

Empowering Individuals with Consolidated Information on Finance

Enable SME segment with seamless cross-border access and trade

Efficient Multi-Currency Payment and Settlements Leveraging Blockchain



Overarching Themes and Systemic Impact



ECONOMICS

Recovery

Monetary Policies

Contagion

POLITICS

Geopolitics

Social Adjustments

Government Priorities

BEHAVIOURS

Working Practices

Spending Patterns

Risk Aversion

CLIMATE CHANGE

Measurements

Asset Quality

Portfolio Strategy

Reverse Stress Testing



Can Reverse Stress Testing Help In Some Ways?

Reverse Stress Testing

Potential Benefits



Agenda

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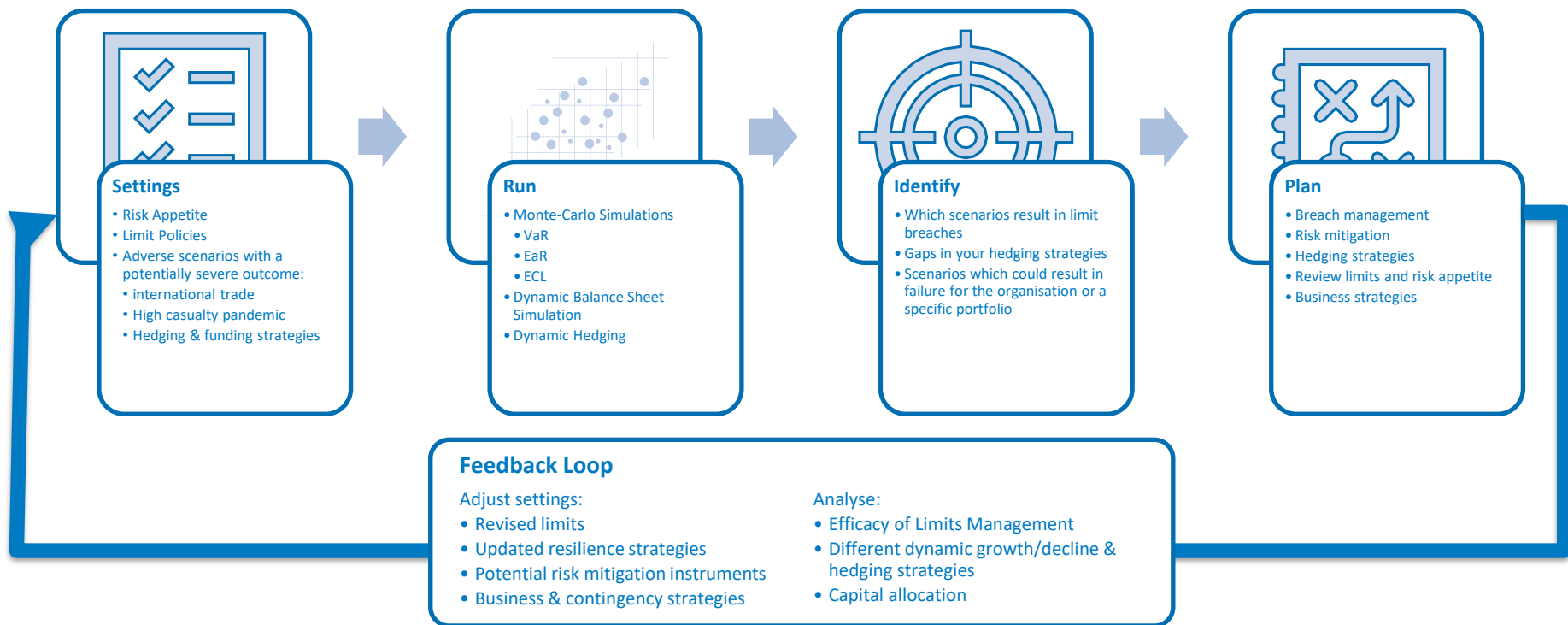


Traditional Stress Testing Across Risk Classes

Wolters Kluwer Bank					
Balance Sheet	Credit Risk Stress	Customer Behaviour	Market Risk Factors	Business Strategy Dynamic Simulation	Macro Models
Assets					
Cash & Cash Equivalents					
Retail Mortgages					
Fixed Income Portfolio					
Trading Portfolio					
Liabilities					
Term Deposits					
On-demand Deposits					
Borrowings					
Equity and Other Capital					
Off-Balance Sheet					
	Ratings/Credit Spreads	Pre-payments	Yield Curves	Business Volumes	Macro Models
	Probability of Default	Remaining Principal	Product Rates	Re-investment	Lookup Tables
	Migration Matrices	Replication & Haircuts	Currencies	By Instrument Characteristics	
	Collaterals & Recoveries	Credit Line Drawings	Indices & Stocks	Non-Financial Cashflows	
	Exposures	Sales or Renegotiation	Volatilities & Correlations	Asset Sales	
Balance Sheet View					

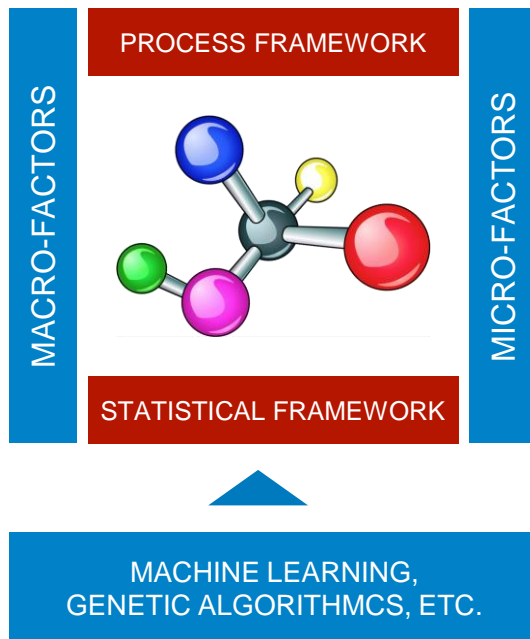


Reverse Stress Testing Approach

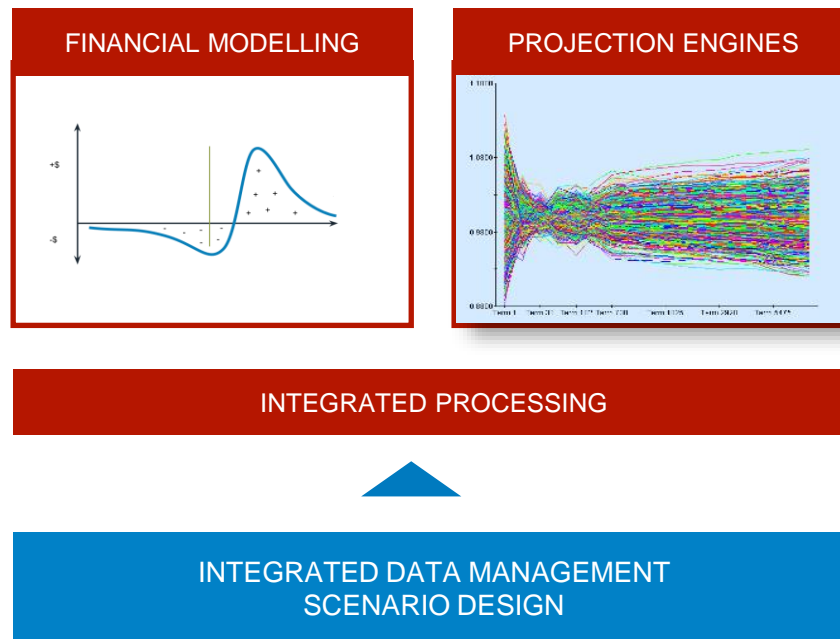


Enhancements – The Potential Future of Stress Testing

FACTOR INTERACTION



SIMULATION AND STRESS TESTING ENVIRONMENT



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Use Cases – Business and Regulatory

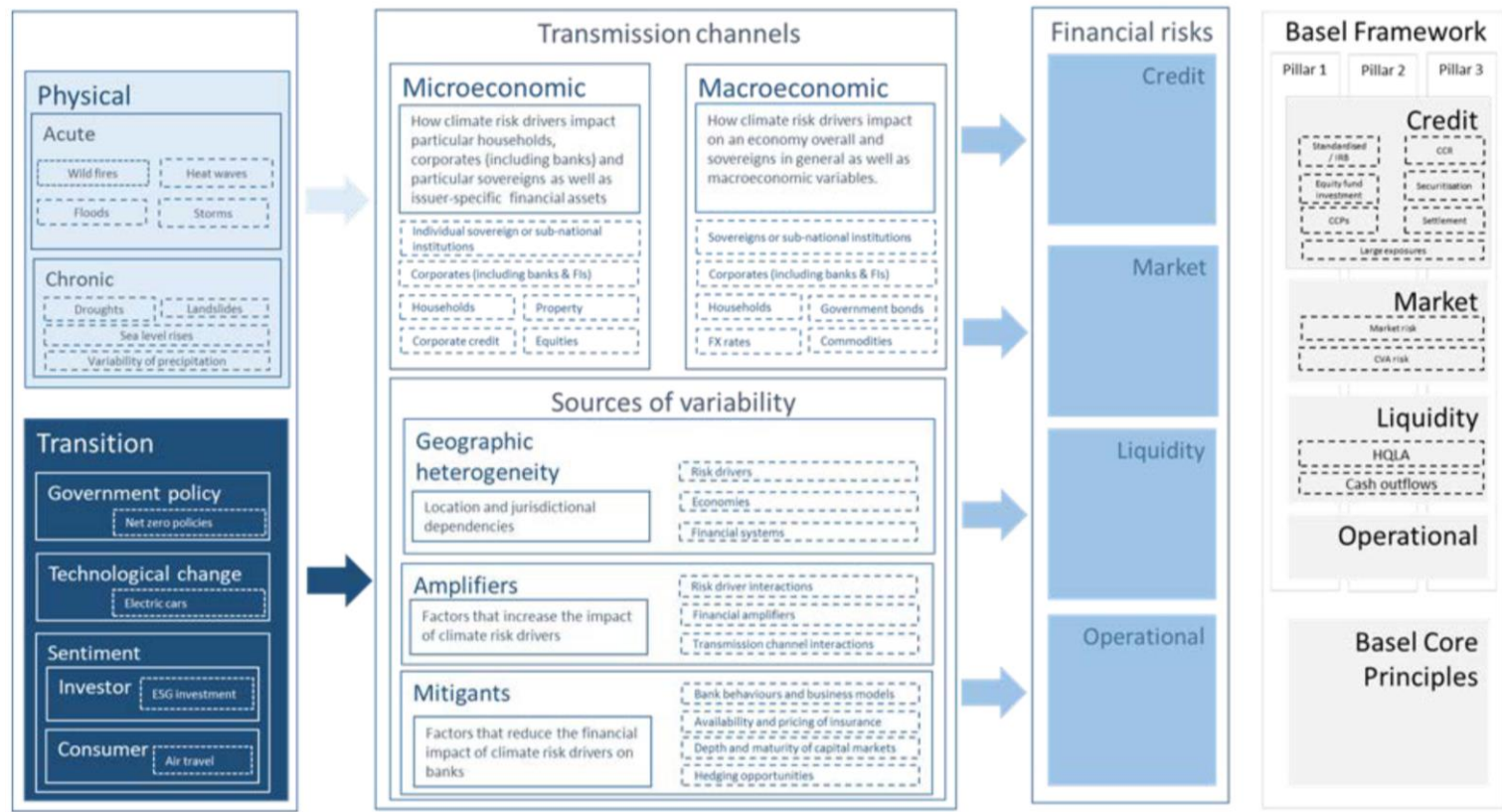
1. Climate Risk
2. Liquidity – ILAAP
3. Capital Impact - ICAAP



Use Case 1: Climate Risk



From Climate Risk to Pillar 2



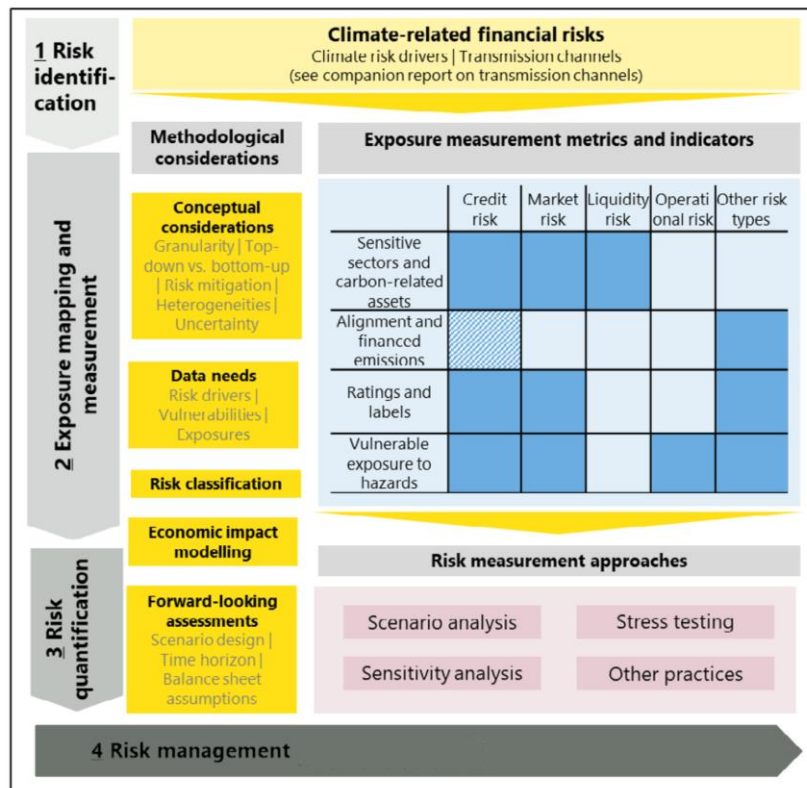
Stress Testing & Scenario Analysis

An effective risk management framework for banks and supervisors should have three goals:

1. identify material climate risk drivers and their transmission channels
2. map and measure climate-related exposures and any area of risk concentration
3. translate climate-related risks into quantifiable financial risk metrics, including deterioration in asset quality

A conceptual climate risk assessment framework for banks and supervisors

Figure 1



Use Case 2: Liquidity



Principles for the management and supervision of liquidity risk

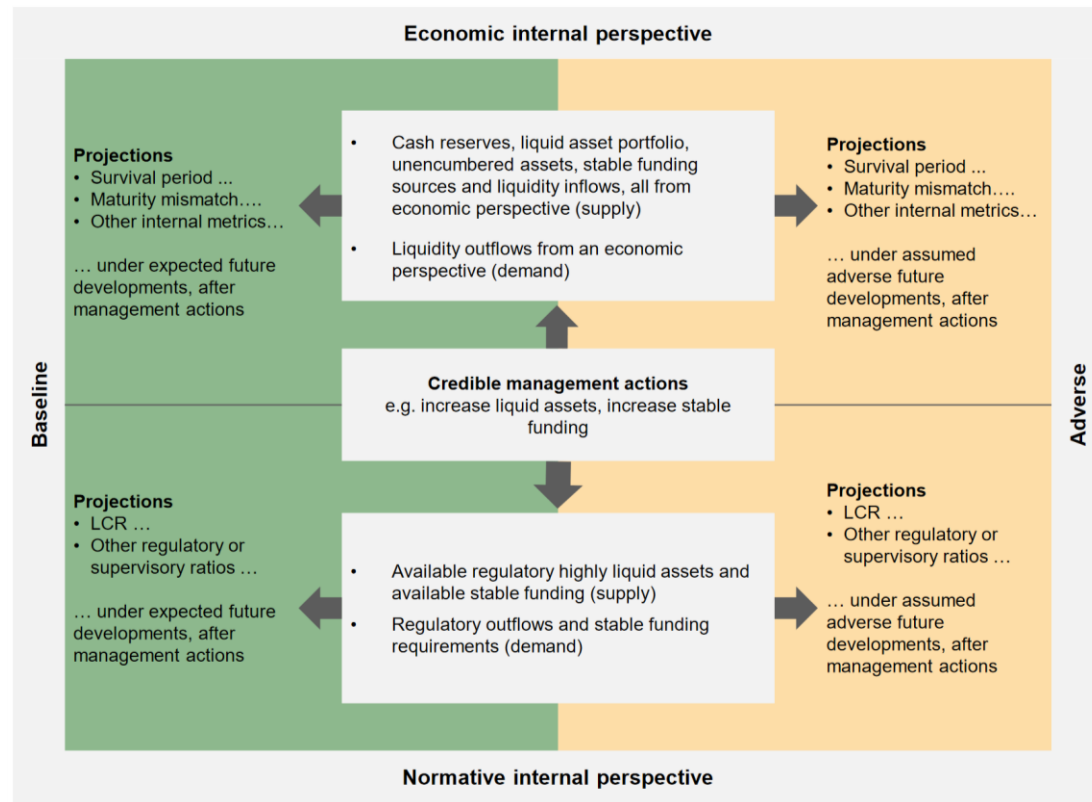
Measurement and management of liquidity risk

- | | |
|---------------------|--|
| Principle 5 | A bank should have a sound process for identifying, measuring, monitoring and controlling liquidity risk. This process should include a robust framework for comprehensively projecting cash flows arising from assets, liabilities and off-balance sheet items over an appropriate set of time horizons. |
| Principle 6 | A bank should actively monitor and control liquidity risk exposures and funding needs within and across legal entities, business lines and currencies, taking into account legal, regulatory and operational limitations to the transferability of liquidity. |
| Principle 7 | A bank should establish a funding strategy that provides effective diversification in the sources and tenor of funding. It should maintain an ongoing presence in its chosen funding markets and strong relationships with funds providers to promote effective diversification of funding sources. A bank should regularly gauge its capacity to raise funds quickly from each source. It should identify the main factors that affect its ability to raise funds and monitor those factors closely to ensure that estimates of fund raising capacity remain valid. |
| Principle 8 | A bank should actively manage its intraday liquidity positions and risks to meet payment and settlement obligations on a timely basis under both normal and stressed conditions and thus contribute to the smooth functioning of payment and settlement systems. |
| Principle 9 | A bank should actively manage its collateral positions, differentiating between encumbered and unencumbered assets. A bank should monitor the legal entity and physical location where collateral is held and how it may be mobilised in a timely manner. |
| Principle 10 | A bank should conduct stress tests on a regular basis for a variety of short-term and protracted institution-specific and market-wide stress scenarios (individually and in combination) to identify sources of potential liquidity strain and to ensure that current exposures remain in accordance with a bank's established liquidity risk tolerance. A bank should use stress test outcomes to adjust its liquidity risk management strategies, policies and positions and to develop effective contingency plans. |
| Principle 11 | A bank should have a formal contingency funding plan (CFP) that clearly sets out the strategies for addressing liquidity shortfalls in emergency situations. A CFP should outline policies to manage a range of stress environments, establish clear lines of responsibility, include clear invocation and escalation procedures and be regularly tested and updated to ensure that it is operationally robust. |
| Principle 12 | A bank should maintain a cushion of unencumbered, high quality liquid assets to be held as insurance against a range of liquidity stress scenarios, including those that involve the loss or impairment of unsecured and typically available secured funding sources. There should be no legal, regulatory or operational impediment to using these assets to obtain funding. |

ILAAP

ILAAP Overview:

Example of different impacts of credible management actions, depending on the perspectives and scenarios considered



Stress Testing Liquidity



Principle 10

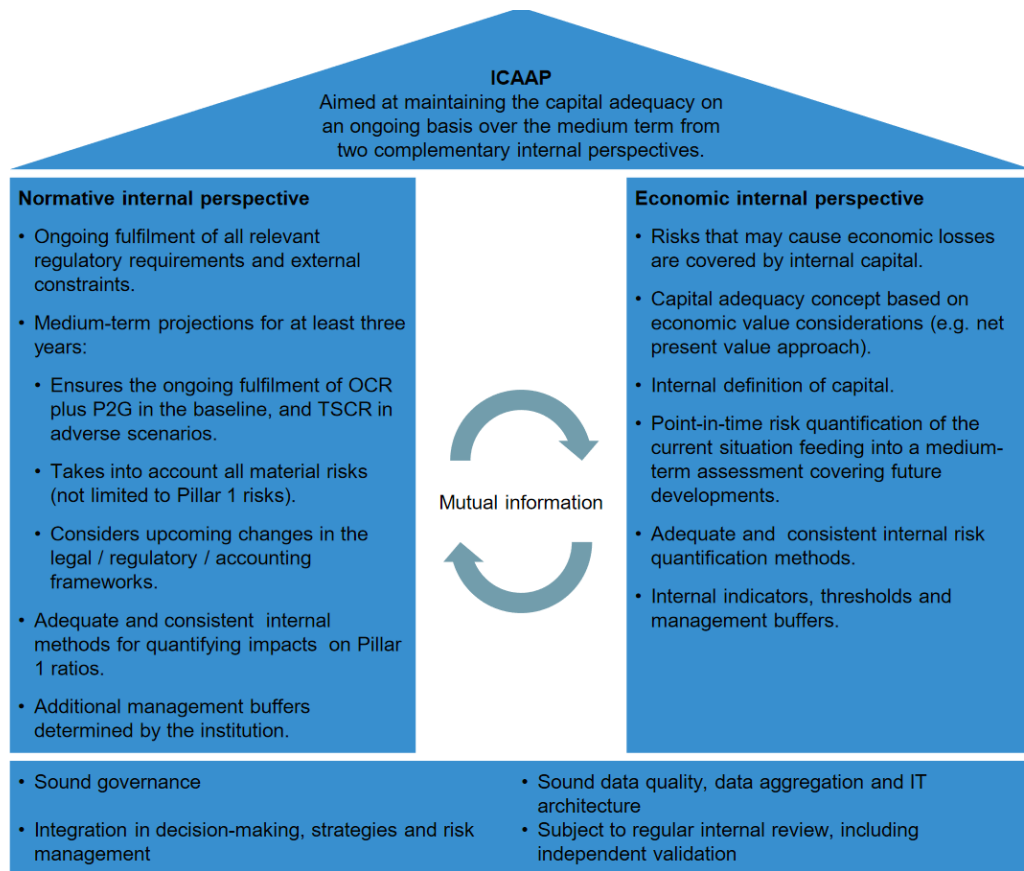
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- identify and quantify exposures to possible future liquidity stresses, analysing possible impacts on the institution's cash flows, liquidity position, profitability and solvency
- Tests should consider the implication of the scenarios across different time horizons
- A bank should also consider the insights and results of stress tests performed for various other risk types when stress testing its liquidity position and consider possible interactions with these other types of risk

Use Case 3: Capital



ICAAP

Overview of ICAAP perspectives and key features



Stress Testing Capital



Supervisory Review Process – Risk Management

- The ICAAP should incorporate **stress testing** to complement and help validate other quantitative and qualitative approaches so that bank management may have a more complete understanding of the bank's risks and the interaction of those risks under stressed conditions.
- A bank should also perform a careful analysis of its capital instruments and their potential performance **during times of stress**, including their ability to absorb losses and support ongoing business operations.
- A bank's ICAAP should address **both short- and long-term needs** and consider the prudence of building excess capital over benign periods of the credit cycle and also to withstand a severe and prolonged market downturn.

Uses Cases Conclusion



Stress Testing serves
Business AND
Regulatory Purposes



Stress Testing applies
to all risk types, incl.
emerging risks



Improving Stress
Testing requires
Improving Data
Granularity

Future proof Stress Testing requires

1. Granular Data Input
2. Internal and Regulatory Metrics
3. Integrated Approach: *across risk types*
4. Flexibility *to integrate Emerging Risks*



Thank You

