

New Stress Testing Challenges for Insurers

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About the speaker

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Stress Testing industry context

Financial institutions are looking at new ways to generate scenarios for stress testing



Some regulatory stress tests moved back to 2021

- New types of Stress Scenarios are being released
- Many insurers are in investment phase for Stress Testing



Climate Risk stress tests have attracted further attention

- Longer time horizons specified
- Added complexity from consideration of physical risks and transition risks



More complexity around scenario generation for stress testing due to Pandemic events

- Larger number of interacting risk factors involved
- Increased severity of shocks to be considered

Model Risk Management Snapshot

Stress Testing is governed by the Model Risk Management Function

Relevant Regulatory landscape

- US: OCC-Fed (SR 11-7)

Other guidelines

- Canada: OSFI (E23 / E25)
- Australia: CPS220
- Europe: EIOPA Solvency II LI

Relevant practices

- End-user computing tools
- Model inventory management framework
- Ongoing model performance monitoring framework and assessment
- Review and documentation templates/playbooks

Modelling

- Model development and remediation
- Pre-implementation testing
- User acceptance testing
- Ongoing performance monitoring
- Documentation

Model governance

- Regulatory interpretation
- Policy design
- Model inventory management
- Model risk aggregation
- Documentation

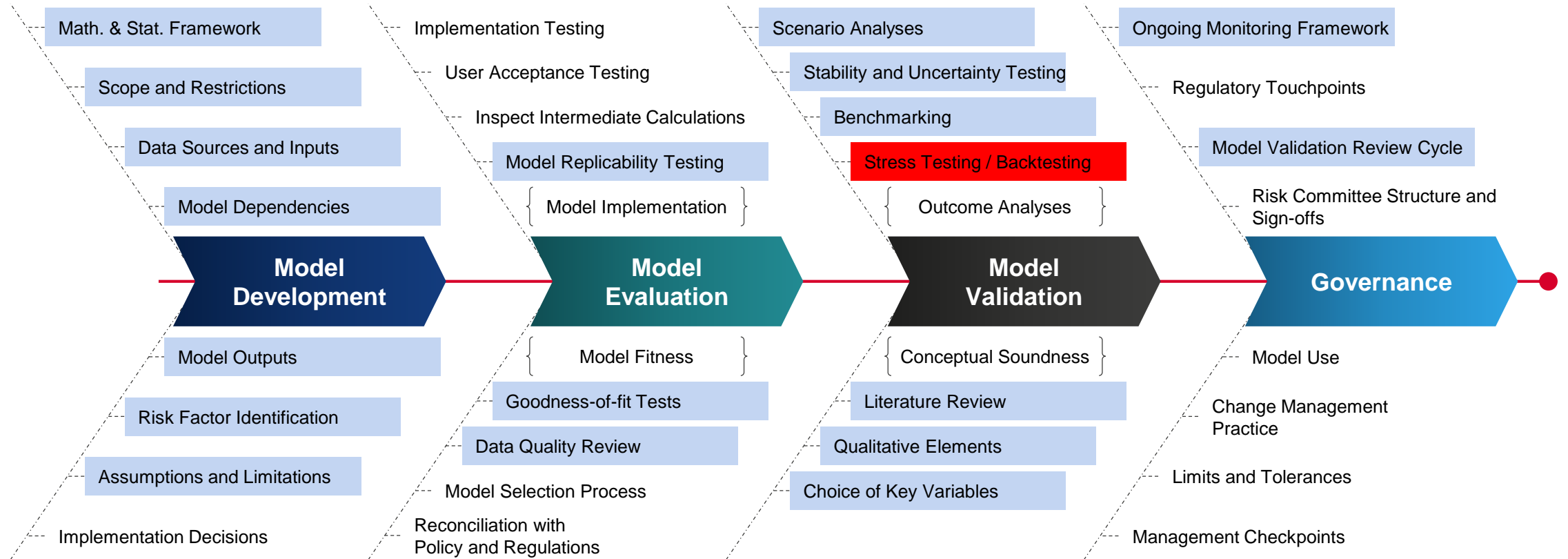
Validation

- Full scope validation
- Partial or change validation
- Periodic validation
- Benchmarking and testing
- Documentation



Model Life Cycle Framework – Illustration

Stress Testing is an intrinsic component of the model validation activities



- Highlighted testing activities have significant commonalities across insurers and banks

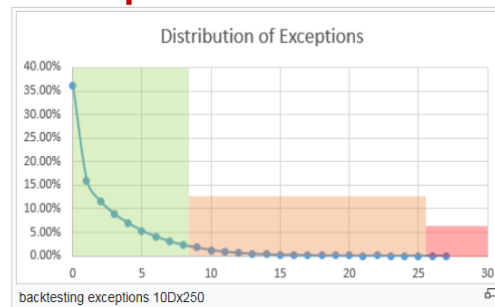
Differences between back testing and stress testing

Stress testing and back testing are fundamentally different

Back Testing

- Backtesting is a term used in modeling to refer to testing a predictive model on historical data. Backtesting is a type of retrodiction, and a special type of cross-validation applied to previous time period(s).

Example:



10-day VaR at 99% backtested 250 days

Zone	Number exceptions	Probability	Cumul
Green	0	36.02%	36.02%
	1	15.99%	52.01%
	2	11.58%	63.59%
	3	8.90%	72.49%
	4	6.96%	79.44%
	5	5.33%	84.78%
	6	4.07%	88.85%
	7	3.05%	79.44%
	8	2.28%	94.17%
Orange	9	1.74%	95.91%

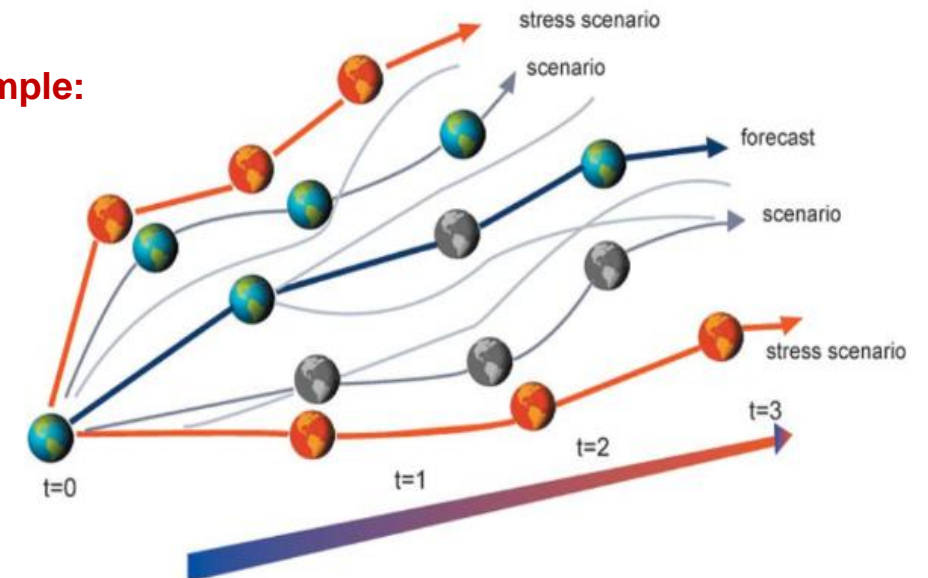
Red	24	0.01%	99.99%
	25	0.00%	99.99%

<https://en.wikipedia.org/wiki/Backtesting>

Stress Testing

- Is a computer simulation technique used to test the resilience of institutions and investment portfolios against possible future financial situations. What's the worst that can happen?

Example:



<https://www.investopedia.com/terms/s/stresstesting.asp>

<https://www.actuaries.digital/2018/04/19/stress-and-scenarios/>

How insurers* deal with Stress Testing in 2019?

Some insurers included pandemic events in their adverse scenario generation tasks

Scenario and Shocks Setting practices

- Monthly stress and scenario analyses on current and plausible events
- Financial shocks on corporate bonds and sovereign spreads, interest rates, and equities (including private equities)
- Historical stress events, e.g., 1987, 2001, 2008 and 2011 financial crises, the 1918 Spanish flu, the 1999 Lothar & Martin storms, Katrina, etc.
- Market deterioration and credit condition shocks, e.g., the widening of yields or spreads of residential or commercial mortgage-backed securities
- Policyholder behaviour including lapses and increased health issues affecting insurability

Stress Testing Frameworks

- A crafty in-house approach / proprietary internal capital and stress-testing framework to measure quantifiable risks, including operations
- Scenario generation and stress testing governed by enterprise risk management and asset liability management programmes
- Management and Control functions may also be involved in stress testing, including ongoing monitoring activities
- Other frameworks to deal with special aspects of stress testing (e.g. counterparty and credit risk frameworks).

Geographical differentiation

- Differentiated model risk management and stress-testing requirements across legal entities due to regulations and actuarial practice (liabilities)
- Specific methodologies of local entities to incorporate shocks in their models, including investment strategies and stress to portfolios
- Liquidity risk scenarios, assuming the closure of short-term debt markets, as well as additional calls on liquidity are handled by the business units
- Reconciliation under a best estimate and systemic adverse scenarios for liquidity planning, liquidity sources and liquidity needs include cash, premium payments and claims expenses

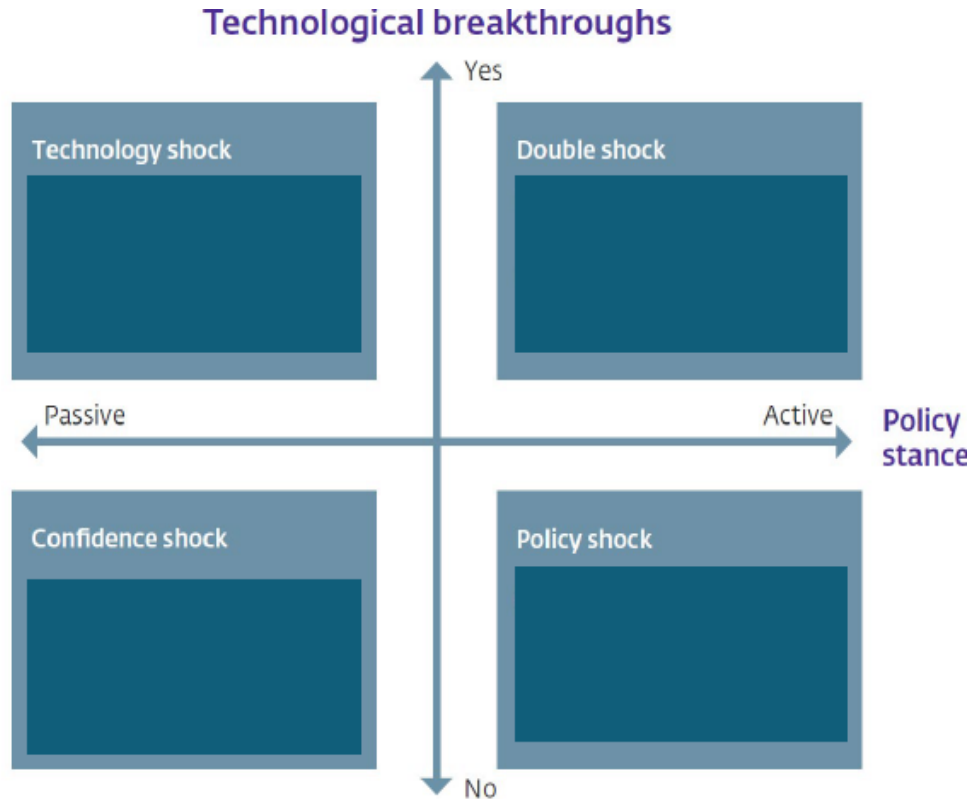
Regulatory guidance

- Pension funds and insurers in Europe followed the adverse scenarios tested in the European Insurance and Occupational Pensions Authority
- The Prudential Regulation Authority (PRA) in the United Kingdom (UK) requested a biennial stress test and report upon its impact on business
- In Canada, the Office of the Superintendent of Financial Institutions (OSFI)-regulated insurers provided evidence that stress testing is integrated into their internal risk management processes
- Guidelines for US insurers and scenario generation around life annuities by the regulator National Association of Insurance Commissioners

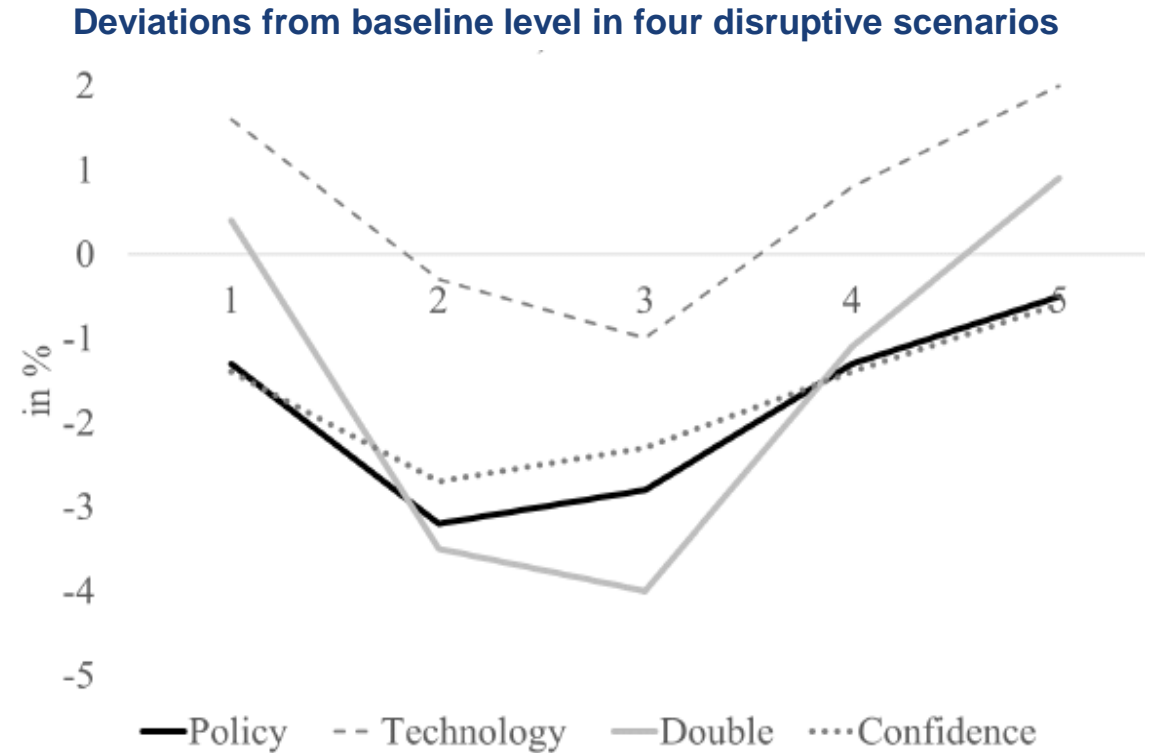
*2019 Best practices based on industry knowledge, financial reports and regulatory notes

Example on GDP*

GDP deviations with shocks focused in carbon tax



Source: Vermeulen et al (2018)



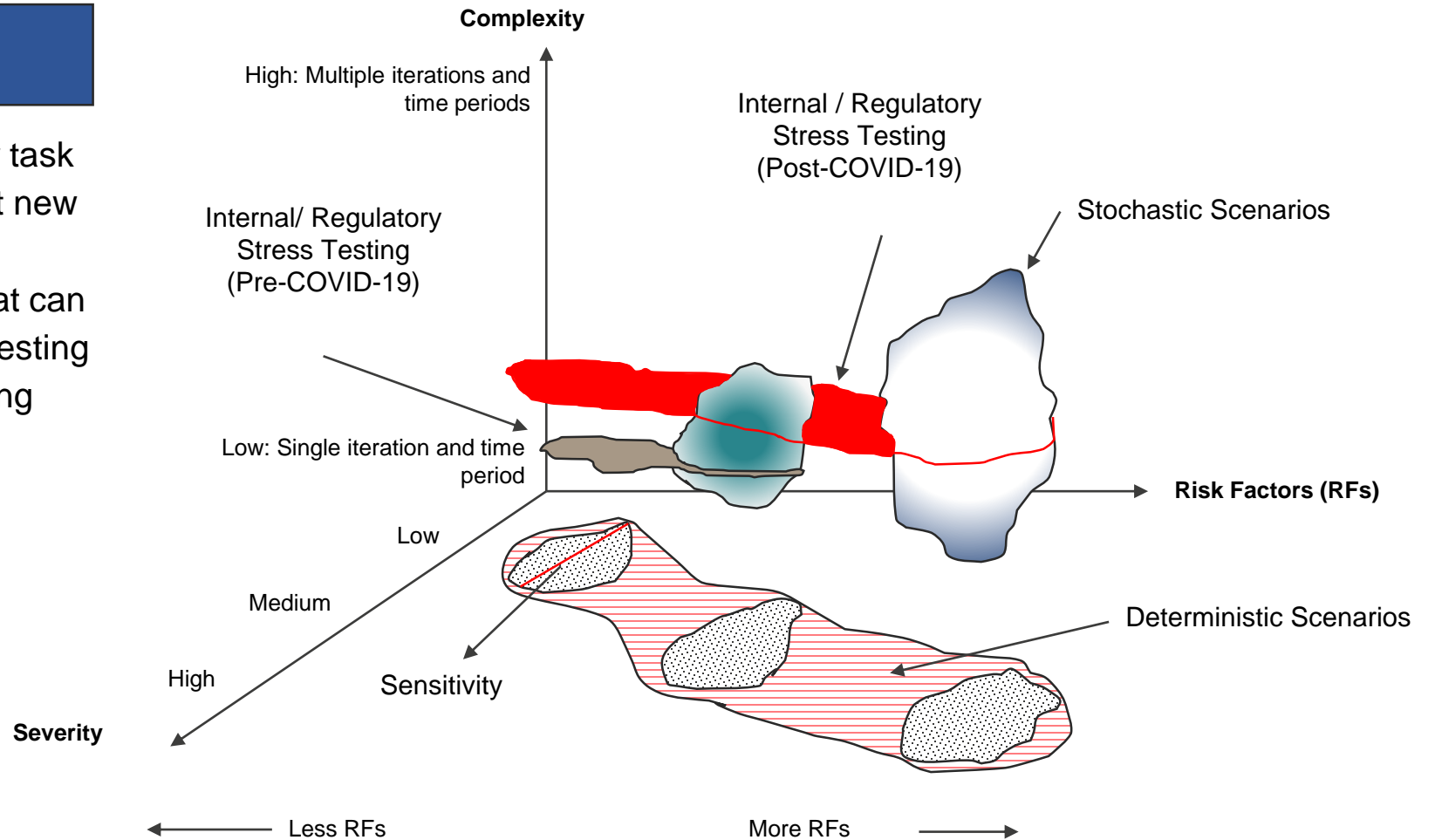
*Nederlandsche Bank N.V. in the countries Low, in which the impact analysis was carried out of a scenario where a tax was established for \$ 100 carbon per ton issued and included a technological shock that involved the elimination of capital stocks. As a result, losses incurred could reach 11% of the value of the assets of insurance companies and 3% of bank assets, in addition to representing a reduction in 4% in the CET1 ratio of Dutch banks.

Stress Testing way forward

Scenario Generation is changing to add robustness to the stress testing activities

Need to update Scenario Generation Process

Insurers are reshaping their task forces to develop and adopt new scenario generation methodologies and tools that can help them deal with stress testing initiatives under the prevailing Business Environment



Business Environment and Scenario Generation

It is imperative to rethink the way scenarios are being developed

Adverse Scenarios Challenge

Even the severely adverse scenarios developed by regulators and the industry last year could not predict what has been observed in the industry and how that has changed the Business Environment components

Business Environment	Opportunities	Risks
Evolving regulations	Engaging with regulators	Lack of readiness, diverting of resource focus and cost increase
Changing competitive landscape	Investing and collaborating with innovative partners	Disruptive new methodologies arrive quicker than before
Technological developments	Modernisation of in-house technologies and processes	High risk of falling behind competitors, market and compliance
Genomics and underwriting	Enhance the accuracy of underwriting and risk management	Information to consumers may become available faster to them than to insurers
Trade wars, pandemics and climate risk	Diversification is the ongoing asset for insurers to keep up on evolving	Capital cash flows may become more difficult across geographies;
Unemployment	The challenging environment can facilitate new and relevant products	The immediate effect of liquidity could lead to insolvency
People skills	Remote workforce can help reduce the scarcity to find the skills needed	Failure to respond to new workforce trends, will detriment insurers

How other risks will change Stress Testing process

Various events will bring changes to scenario generation approach

Event	Impact to scenario generation approach
Ecosystem	<ul style="list-style-type: none">• New EIOPA Stress Tests Methodology aims at a consistent approach for insurers• Consumer behaviour shocks such as rationality and genomics for lapses and persistency of policies• Incorporate competitor's financial status into the stress testing shocks• Systemic risks such as trade wars, de-globalisation and cash-flow restrictions
Financial	<ul style="list-style-type: none">• Credit risk downgrades and derivative risks• Liquidity and solvency scenarios• Interbank Offered Rates (IBORs) and Euro Overnight Index Average (EONIA) replacement
Insurance	<ul style="list-style-type: none">• Longevity of risk and pandemic events• Transversal risk factors• Premiums and reserves volatility
Operational	<ul style="list-style-type: none">• Catastrophic events and climate shocks• Legal impact from IBORs and EONIA transition• Modernisation of in-house technologies including new people skills

Key Take Aways

Scenario generation is key component of stress testing

- More complexity around scenario generation for stress testing
- Additional Risk Factors (variables) are being included in the scenario generation process
- Trade wars, Climate, Pandemic and Cyber Risk are at the top of the agenda.
- Role of actuary to be transformed in the MRM function as business, regulations and requirements evolve
- Insurance stress testing practices have similarities are very crafty and not scrutinized by regulators
- Some good practices in insurance stress testing have been put in place thanks to the imitation of banking industry practices and clear influence from actuarial practices
- Large upgrades to Risk IT systems required, to permit enterprise-level Stress Testing and breaking of silos

References

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**Thank you very much for
your attention!**



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