



Stress Testing and Reverse Stress Testing

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Agenda

Insurance Industry Experience

Stress testing

Reverse stress testing

Areas to Consider

Lessons learned

Challenges

Terminology

What has been happening so far?

- Our headline experience – based upon capital modelling
- Wider experience
 - Reserve analysis
 - Pricing analysis
- An evolving area
 - Company differences due to history / culture
 - Lloyd's (regulatory) influence
 - Proportionality
 - Quality of reporting can differ from quality of analysis
- Banking experience

Terminology

Working definitions

Stress/Sensitivity Tests

One-way analysis of the impact on a given metric/result of defined changes in a key input parameter

Scenario Tests

Analysis of the impact of multiple stresses occurring simultaneously

Reverse Stress Tests

The process and results surrounding the identification of those scenarios that could give rise to business failure, i.e. What would it take to 'break' the business?

Terminology

FSA definitions

Stress Testing

“We expect firms to develop, implement and action a robust and effective stress testing programme which assesses their ability to meet capital and liquidity requirements in stressed conditions, as a key component of effective risk management” (PS 09/20 para 1.1)

Reverse Stress Testing

“Reverse stress-testing is a separate, but complementary exercise [to general stress and scenario testing]. It is essential that firms identify what could cause their business to fail and use this information to ensure that the relevant risks are sufficiently well-understood and appropriately managed to secure consumer protection and market confidence” (Paul Sharma, 11 December 2009)

Stress Testing

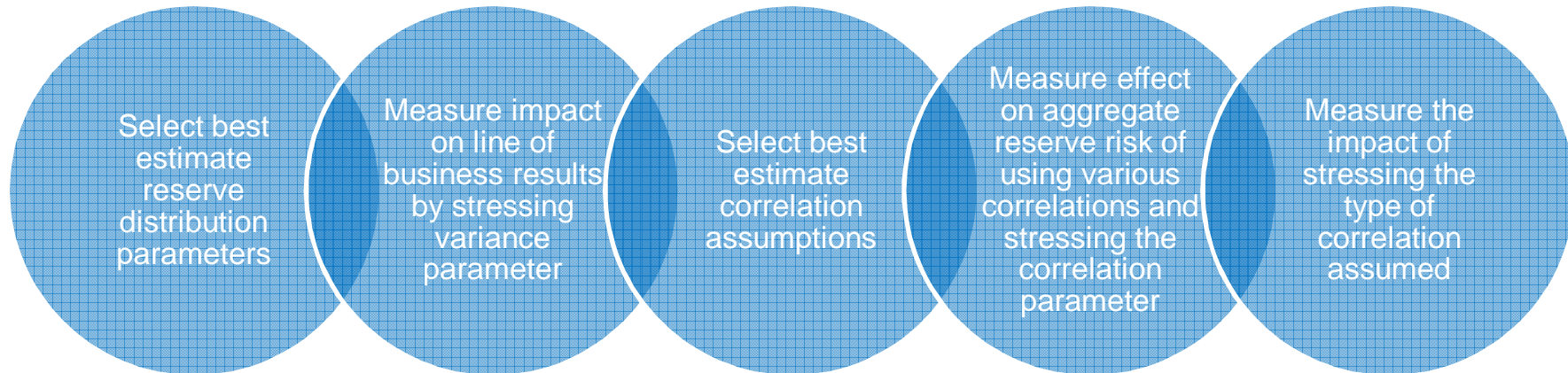
Stress testing

In the context of capital modelling

Performed on all material parameters that impact capital modelling

- Typically done for several parameters within each risk category
- Includes stressing correlation assumptions
- Investigates the impact on the relevant level of capital-modelling result
- The capital-modelling report will detail the results of all stress testing performed as part of the analysis

Example - stress tests on reserve risk as part of insurance risk:



Stress testing

In the context of capital modelling

Similar stress testing might be performed within the underwriting / premium risk area of insurance risk

- Vary parameters within a line of business
- Vary parameters effecting combining lines of business

Similar stress testing might be performed within the catastrophe risk and large claims risk areas of insurance risk

- Vary parameters effecting claims frequency and severity
- Vary loadings applied to allow for missing exposure / inadequate models

The combined impact on total insurance risk of the various underlying stresses would be tested and reported

- Focus on risks that analysis demonstrated were most material in the context of total insurance risk
- Vary the correlation parameters effecting the combination of reserve, premium, large and catastrophe risks

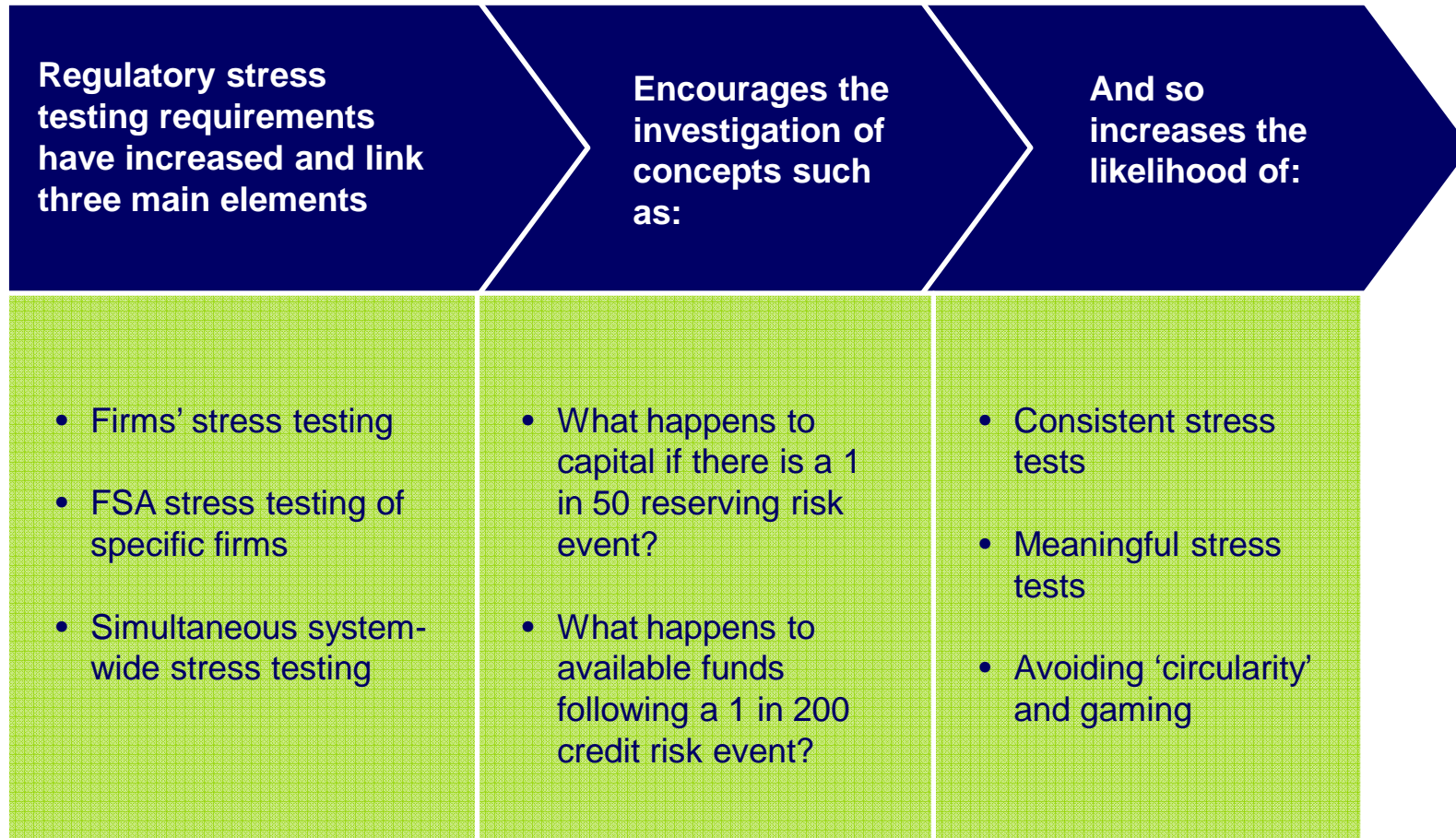
Stress testing

Challenges and considerations

- Stress test results can be informative within the context of a specific piece of analysis
- Stress test results may not be meaningfully comparable between entities
 - Different models
 - Different parameters
 - Different stresses applied
- By what amount should a parameter be stressed?
- Stressing a materially incorrect parameter might still result in a materially incorrect parameter
- Circularity - are levels of stressed parameters picked to ensure that the results are not too material?

Stress testing

Regulatory requirements



Stress testing

Regulatory requirements

PS09/20 – ‘Good practice in stress and scenario testing’:

1. Board and senior management should actively engage in stress and scenario testing
2. Senior management should take a key role in implementing the firm’s stress testing programme
3. Senior management should take action as a result of stress testing and integrate stress testing outputs into the firm’s decision making process
4. Firms should establish a stress testing programme covering all relevant levels of its business, all risk types and over a range of severities
5. Stress and scenario testing should be undertaken on a forward looking basis
6. Firms should establish a robust stress testing infrastructure with appropriate IT systems and resources in place
7. Firms should have clearly documented policies and procedures to enable effective implementation and maintenance of the stress testing programme

Reverse Stress Testing

Reverse stress testing

“By how much would a key measure need to change to cause this level of movement in capital?”

“Which scenarios are most likely to cause their current business model to become unviable?”

Approach:

- Identify what ‘failure’ means
- Work through the risk exposures to identify which items could trigger failure and by how much they would need to move
- Express the results in terms of metrics and levers

Reverse stress testing

The FSA has provided guidance on the elements that it would expect to find in a reverse stress testing implementation plan, including:

- Detailing quantitative and qualitative approaches that will be used
- Performing tests at Solo and Group levels
- Covering all lines of business
- Full details of the process to be used to identify and agree reverse stress tests
- Linking reverse stress tests with risk appetite
- Process for linking reverse stress test results to management actions

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