EUROPEAN INSURANCE
AND OCCUPATIONAL PENSIONS AUTHORITY

Stakeholder event
Study on Diversification in Internal Models

27th August 2020 – by WebEx

Agenda

1. Introduction
2. Study on Diversification in Internal Models
3. Link between IM-PGs
4. Q&A
5. AoB

1. Introduction

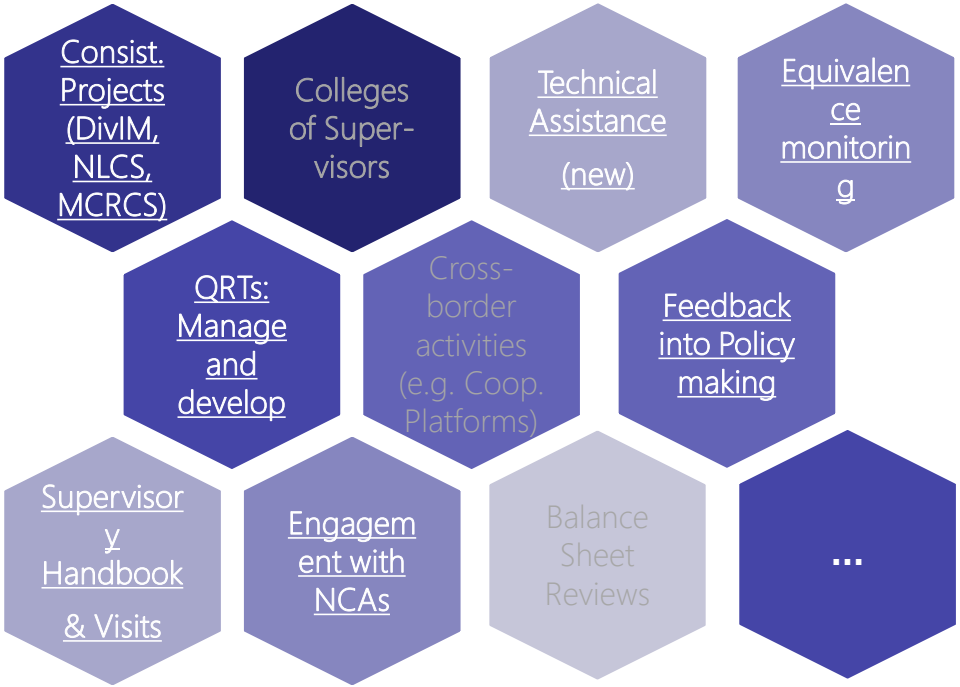
- Welcome
- Oversight and Internal Models
- Housekeeping -> Directions for our Call

1. Introduction
EIOPA Oversight Department

A well functioning single market ensures an appropriate and comparable protection level for all policyholders. To ensure a levelled playing within the single market the **Oversight Department** therefore works together with a number of stakeholders to promote a Common European Supervisory Culture.

The **Internal Model Unit** focuses in particular on aspects linked to the fair evaluation of internal models.

1. Introduction
EIOPA Tools and activities

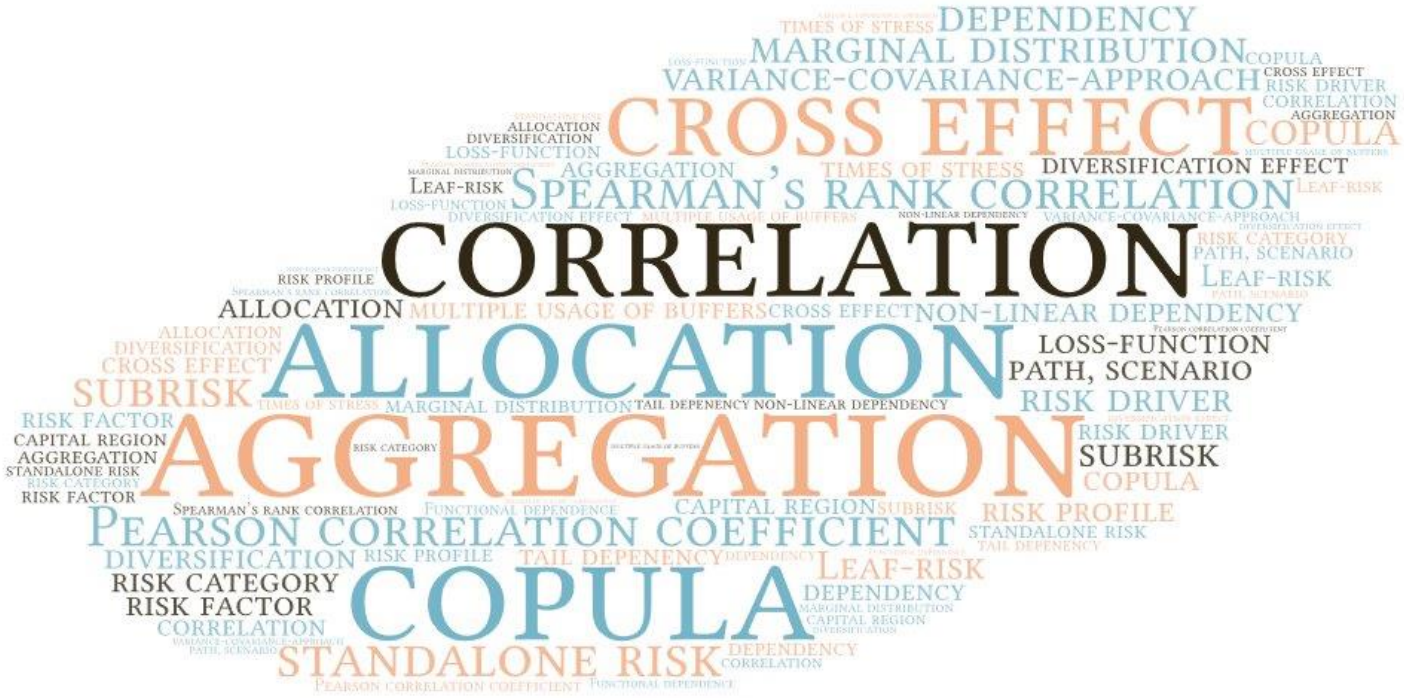


2. Study on Diversification in Internal Models
Rationale

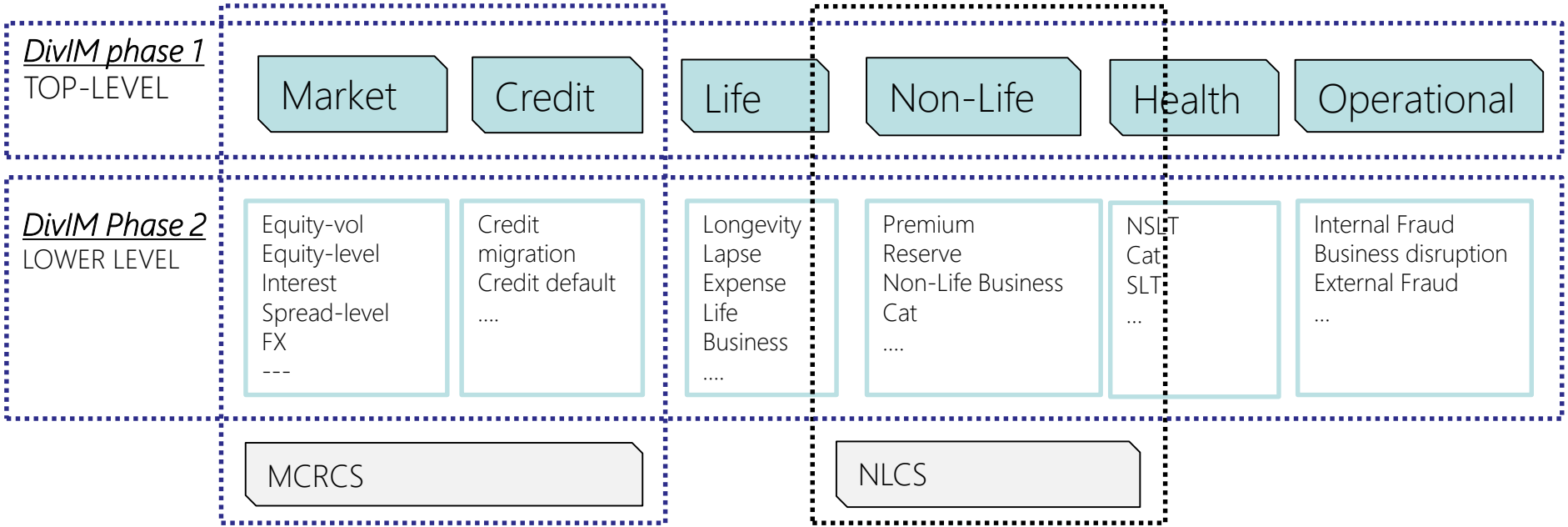
- As part of EIOPA's Single Programming Document with its annual work plan, we work to further increase convergence in the supervision of Internal Models
- Since the start of Solvency II, a number of Internal Model Comparative studies have been conducted, but not yet in the domain of Diversification
- The conducted comparative studies have already led to improving the models and increased supervisory convergence
- Diversification is omnipresent and crucial for insurance business. Modelling freedom in Solvency II can ensure a bespoke solution to fit the internal model to capture the underlying risks and resulting diversification benefits.
- These bespoke solutions also give rise to certain challenges, for instance where the justification of results largely rely on expert judgement. We deem it relevant to further increase supervisory convergence on this topic

2. Study on Diversification in Internal Models

What do we mean with Diversification?



2. Study on Diversification in Internal Models
Top level/lower level risks



2. Study on Diversification in Internal Models
Timeline

- Stock take at NCA level
- Defined scope and objectives
- Defined analyses to serve as a base for the first phase study
- Drafted questionnaires to meet the objectives

Indication for future activities

- Launch Data request phase 1 - Oct 2020
- Submission deadline - mid January 2021
- Feedback to undertakings - mid 2021, and intermediate feedback during analysis
- Prepare 2021 data request MCRCS, NLCS and Diversification phase 2 - launch Q2 2021
- Feedback to undertakings - Q4-2021/Q1-2022

Stakeholder event
August 2020

2. Study on Diversification in Internal Models
The "NCA Stock take"

Use of available information

- Information available to NCAs, e.g. via model approvals, have led to gain first insight in:
  - Existing aggregation approaches / structures
  - Identification of challenges and concerns
  - Peer comparison possibilities

- As a result, despite the diverse and complex landscape of modelling approaches and aggregation structures, the Project Group identified possibilities for peer comparisons on 'top level' risks.
- Analysis on lower level risk dependencies are more complex to conduct.
- The main challenges lie in the i) use and setting of key correlation coefficients, ii) justification of expert judgement and iii) substantiation of diversification effects in times of stress

⇨ In depth PG discussions have led to draft the objectives and scope on the following slides.

2. Study on Diversification in Internal Models
Objectives and benefits

Objectives

- Collect an overview of current market approaches in order to analyse and compare the levels of diversification.
- Facilitate a shared understanding of modelling dependencies, aggregation and resulting diversification benefits.
- Contribute to enhance quality and convergence of supervision in internal models.

Benefits

- Undertakings benefit from this work at it leads to i) a more level-playing field via an enhanced harmonization of supervision, ii) an increased general acceptance of aggregation within internal models and iii) opportunities for model improvements.

2. Study on Diversification in Internal Models
Scope (1/2)

The analysis performed will not include geographical diversification, the evaluation of diversification between entities and diversification coming from intra-group transactions.

In addition to the risk profile itself, the modelling of Diversification effects depends on a variety of factors, such as the level of correlations, tail dependency, number of risk factors, shape of underlying risk distribution functions and the dependency structures. These factors may operate at different levels. These complexities lead to the following scope and phases:

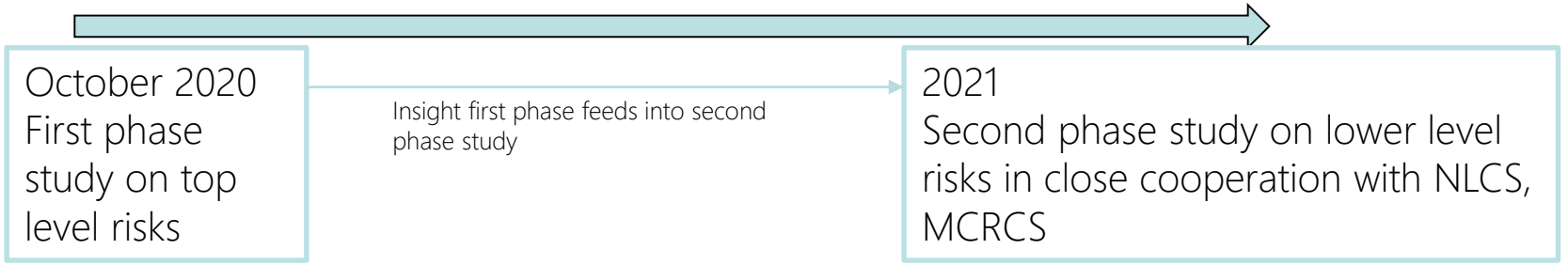
1. Top level risks (market, credit, life, non-life, health, operational), to better understand aggregation and diversification at this level and to analyse the material dependencies observable within the sample;
2. Lower level risks (e.g. interest rate, equity, longevity, natural catastrophe), to understand where additional diversification benefits lie and further support the comparison between participating firms.

A peer comparison analysis will be carried out in two phases.

2. Study on Diversification in Internal Models
Scope (2/2)

To balance complexity and completeness, the study will first focus on top level risks before analyzing the second phase.

The PG works closely with the existing MCRCS and NLCS PGs, e.g. to exploring options to combine templates for data requests and to prevent duplicating work, and will mutually share its findings and conclusions. The remaining slides primarily focus on the first phase of this study unless otherwise stated.

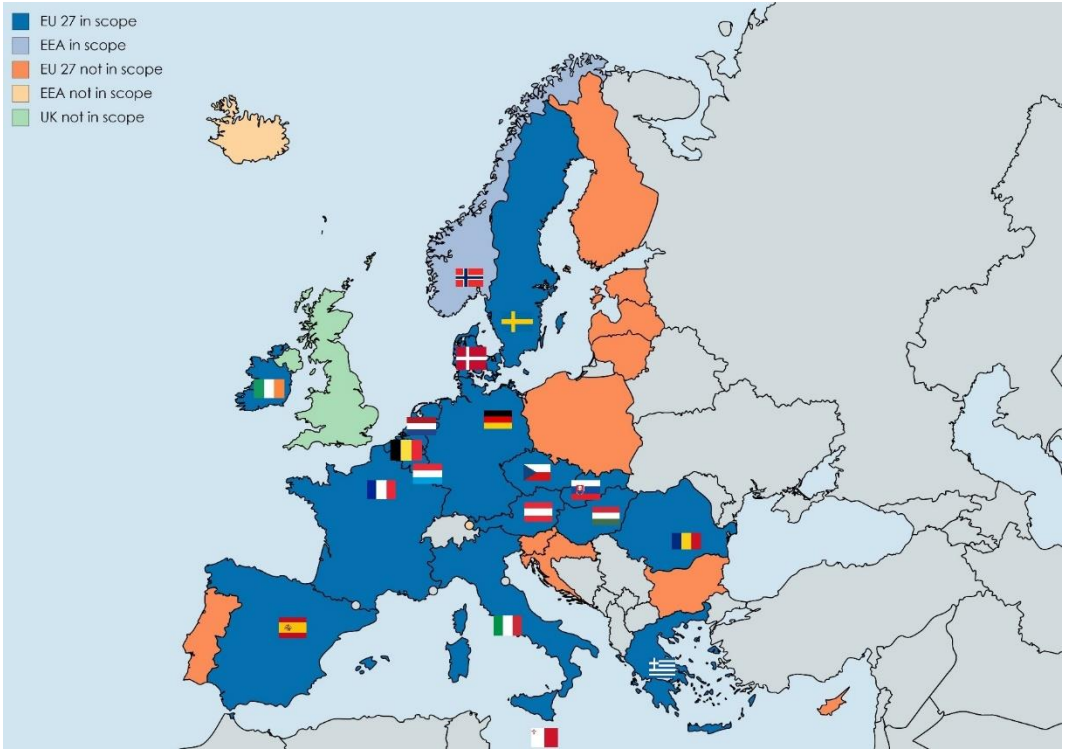


2. Study on Diversification in Internal Models
Coverage of participants

- Modelling approaches and aggregation structures are diverse and often parts complex. In cases, there is a strong link between solo undertakings and group for the calibration activities and aggregation structures. In these cases it is necessary to consider the group perspective in the scope of the study to complete the understanding of diversification benefits between risks.
- In other cases, the study at solo level is sufficient for comprehension of diversification effects.

- Aim for a wide participation rate –All Internal Models except UK based undertakings
- 18 countries from the EEA selected for the first phase of the study, comprising in total approx. 140 solo undertakings
- Undertakings aggregating the top level risks using the SF method, including its correlations, will only fill in a subset of the qualitative questionnaire.

2. Study on Diversification in Internal Models
Coverage of participants - graphical



2. Study on Diversification in Internal Models
Analyses (1/3)

The questionnaire is developed to allow carrying out the following analysis:

1. Concentration of risks: Viewing diversification in the light of concentration in the sub risks, see below
2. Determination of a single metric to enable comparisons, next slide
3. Scenario analysis and mix dependence and single risks of undertakings. *Perform statistical analysis on marginals, standardized marginals and gauge SCR impact of dependency function framework, slide 18*

Concentration of risks

- The concentration of the contribution of the sub risks to the overall SCR sets limits on the diversification effect that can be achieved.
- Comparison will indicate where the diversification is high given the concentration across risks. This is possible across undertakings as well as over time
- This method does not need additional assumptions, can capture main effects and results provide focus for further analysis

2. Study on Diversification in Internal Models
Analyses (2/3)

Single metric to enable comparisons

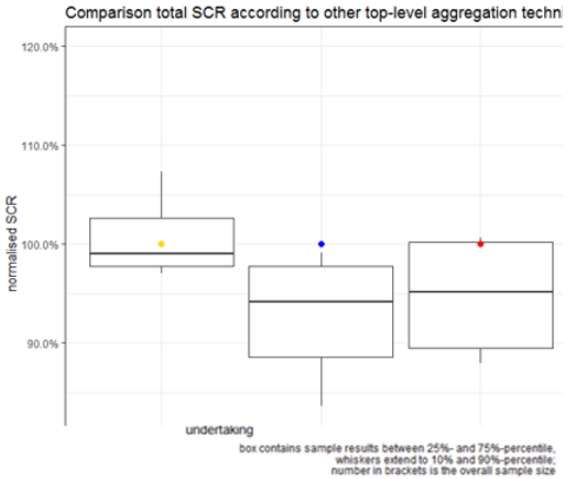
- **Diversification benefit (DB)** can be measured in a function between the diversified and undiversified capital.
- DB is not often appropriate for comparisons between undertakings as the result also depends on whether dominant risks are present, i.e. is high diversification benefit caused by weak dependency or, legitimately, a more balanced portfolio?

- **Diversification score**, measured as diversification benefit relative to full independence, is significantly less sensitive to how concentrated the underlying risks are.
- This insensitivity makes it a suitable yet simple metric to compare the overall strength of dependency between undertakings at top risk level with little distortion from the relative sizes of underlying risks.

2. Study on Diversification in Internal Models
Analyses (3/3)

Mix dependence and single risks of UTs

- Statistics as described in the previous slides often do not allow to fully capture tail dependencies.
- The quantitative questionnaire requests simulation data that enables analysis on joint exceedance probabilities and empirical copulas.
- Diversification modelling is very different across undertakings and standardization of the model output for this study facilitates comparisons.
- The analysis consists of **mixing the dependency structure of undertaking A with the single risks of undertaking B to calculate alternative SCRs**. This analysis allows to position the undertaking with respect to the sector as a whole and to the Standard Formula which permits to compare SCRs across peers



2. Study on Diversification in Internal Models
Questionnaires for Top level risks

- Undertakings are requested to fill in a:
  - Quantitative questionnaire: this is an Excel file requesting simulation data based for internal model risk categories
  - Qualitative questionnaire: Supporting the quantitative questionnaire to better understand the results and to gain insight in the wider context of diversification including the potential impact in the calibration settings due to COVID-19.

- Technical specifications provide instructions to fill the templates

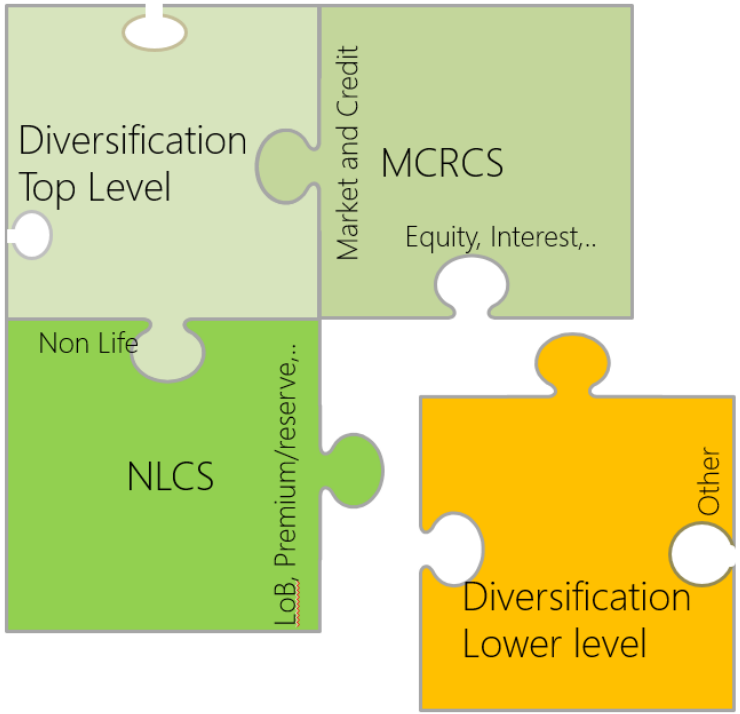
2. Study on Diversification in Internal Models
Process

- EIOPA will publish the data request on its website
- NCA contact points perform the communication with the participating undertakings and collect the data. The group supervisor collects the data for all entities of a group.
- The qualitative questionnaire should be submitted by the undertaking via an online survey tool
- Undertakings applying the SF method, including the correlation settings, for the top-level risks, should only fill in a subset of the qualitative questionnaire.
- **Deadline** for submission: 15th January 2021

2. Study on Diversification in Internal Models
Outlook

- The PG support NCA and undertakings during the first phase information request
- The PG will develop the data request in close cooperation with the NLCS and MCRCS PGs, also addressing the lower level dependencies
- Undertakings will receive feedback on the results of the EEA Internal Model participation at the end of the Study,
- However, intermediate results will be shared with them on the analysis the PG conducts (see slides on 'analysis')

3. Link between IM-PGs
Overview



The first phase of the study addresses the top level risks (market, credit, life, non life, health and operational risk)

The second phase of the study in 2021 addresses material lower level dependencies within risk modules, e.g. between equity and interest, but also across risks as credit spread and longevity.

3. Link between IM-PGs
MCRCS

Main objectives:

Support the supervision of Market & Credit Risk models and foster convergence of supervisory approaches given the potential choices of mathematical, statistical and IT solutions to tailor models to the actual risk profiles. The study should also allow supervisors to analyse models, model changes, approaches and calibrations over time and spot potential trends. The results should facilitate reviews of the overall variability of model outcomes as well as analyses of single model components (e.g. risk factor model) more deeply in order to explain the overall behaviour.

Approach:

Use of Benchmark Portfolios composed of synthetic assets, to allow having a stable comparison point over time which is combined to the assessment of the relevance of these assets in terms of exposure and modelling for the participants.

3. Link between IM-PGs
NLCS

Main objectives:

The exercise aspires to increase the understanding of the relative positioning of IM undertakings with respect to the Non-Life Underwriting Risk by providing insights from a European perspective. The outcomes of the study are intended to support NCA's supervision of the on-going appropriateness of internal models. The exercise takes into account lessons learned, feedback received as well as strategic considerations from stakeholders involved in the last edition.

Approach:

Use internal model outputs and decomposition of certain effects (on a European sample size) in order to arrive at a Fair View of internal model solo undertakings modelling Non-Life Underwriting Risk.

Q&A

AoB